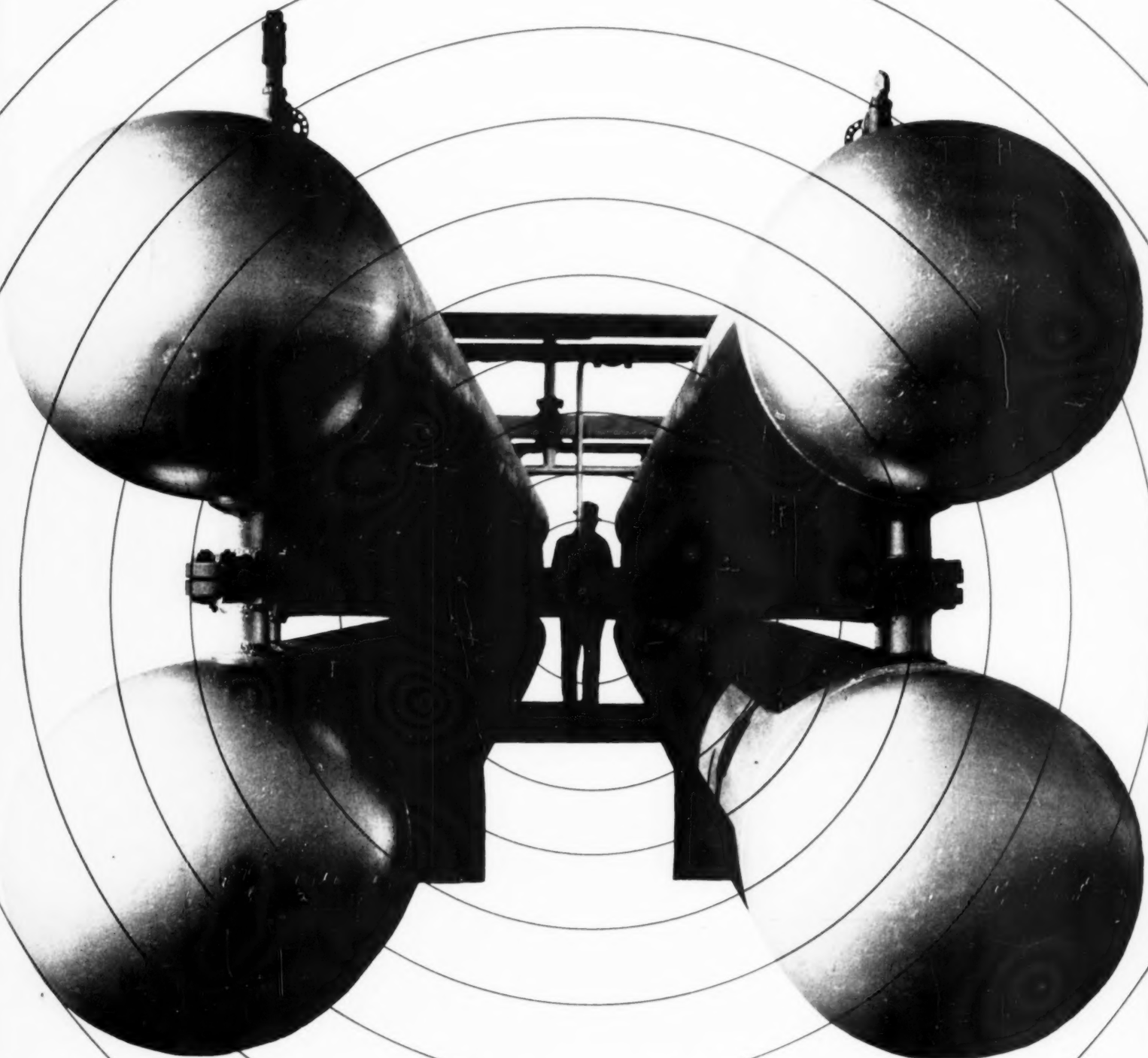
JANUARY, 1953

World Petroleum



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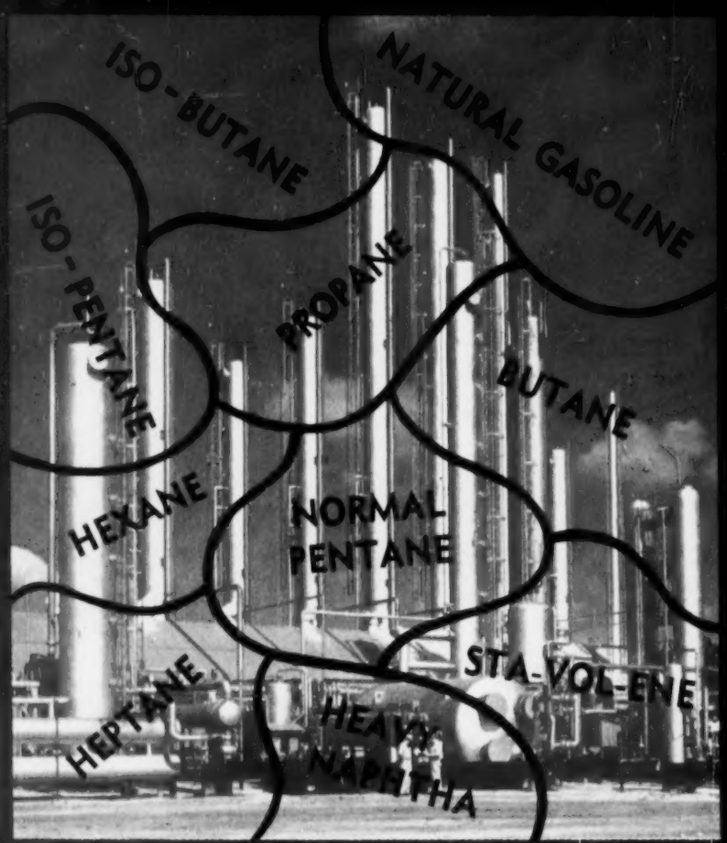

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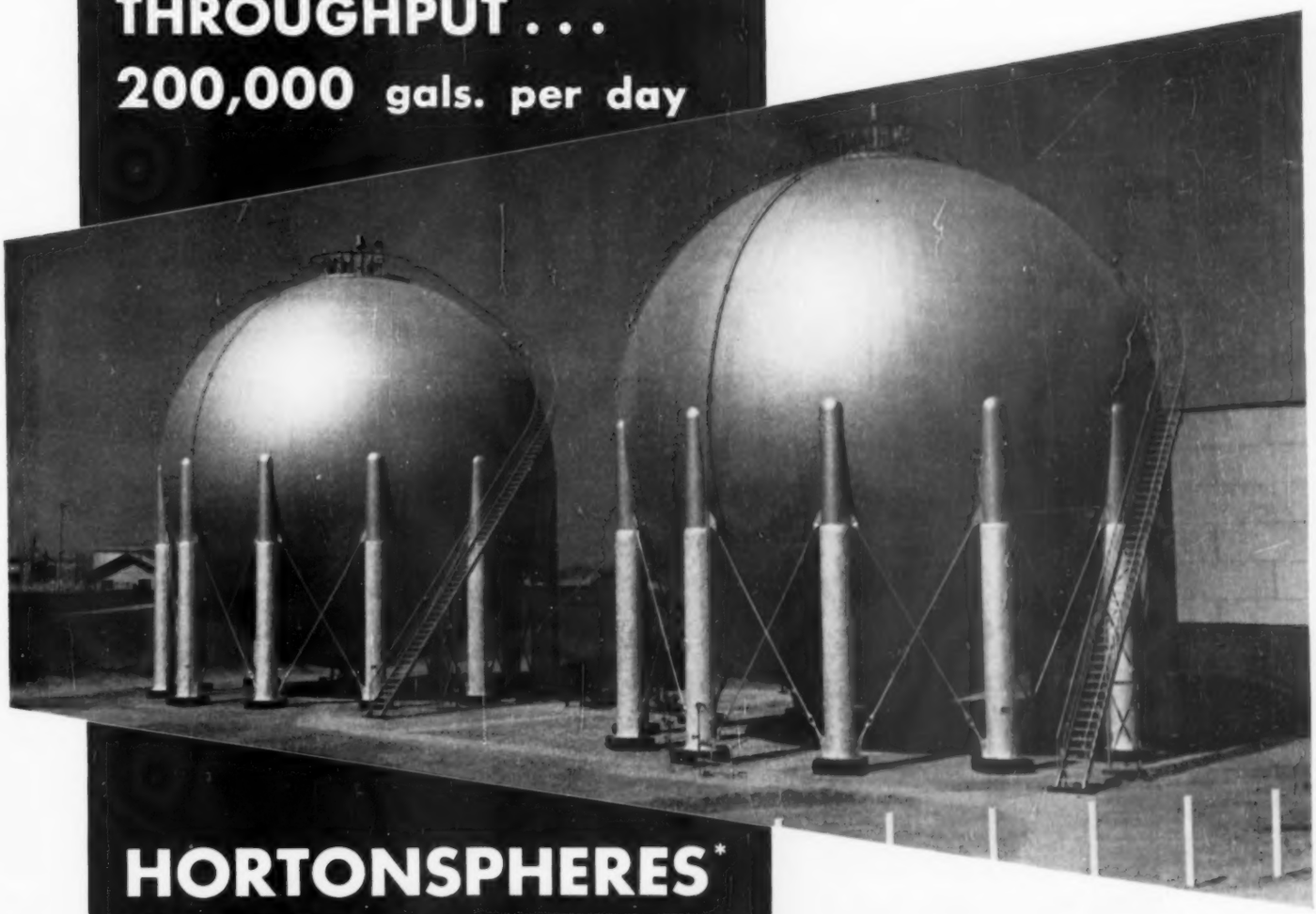

HORTONSPHERES* Store Butane at Modern Refinery

The two 15,000-bbl. Hortonspheres illustrated above are located at a refinery on the Pacific Coast. They are used to store normal butane produced in refinery cracking operations plus shipments received from field sources. Transported to and from the refinery by pipe line and tank truck, the average throughput of butane is *approximately 200,000 gals. per day.*

The butane stored in the Hortonspheres is used for gasoline blending, to feed a 1,000-bbl. per day isomerization unit, and for sales in bulk quantities as LP gas.

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Hortonspheres can provide your refinery with dependable service. They are available in capacities up to 30,000 bbls. designed for pressures up to 217 lbs. per sq. in. in the smaller capacities. They are entirely free from operating difficulties due to severe weather conditions. With the exception of the relief valves, there are no moving parts. Maintenance costs are reduced to a minimum.

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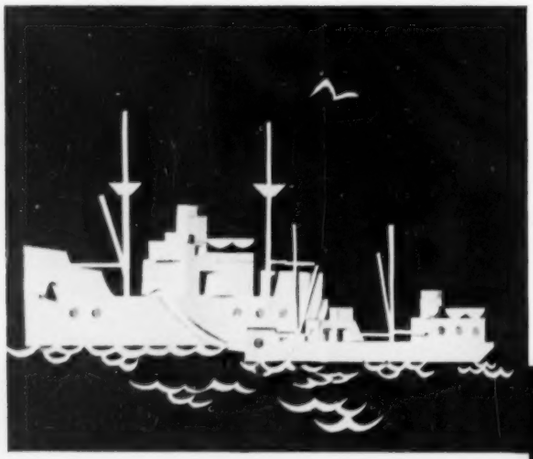

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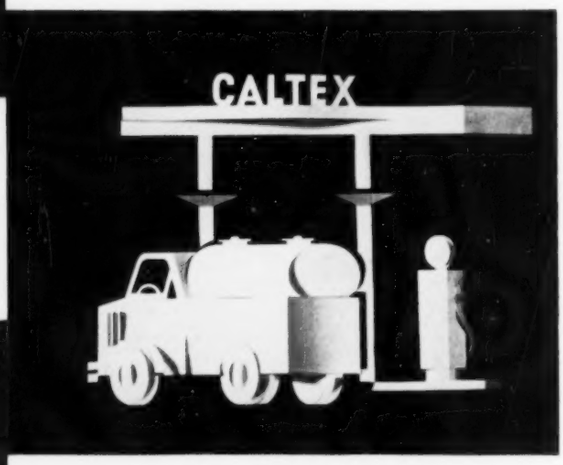

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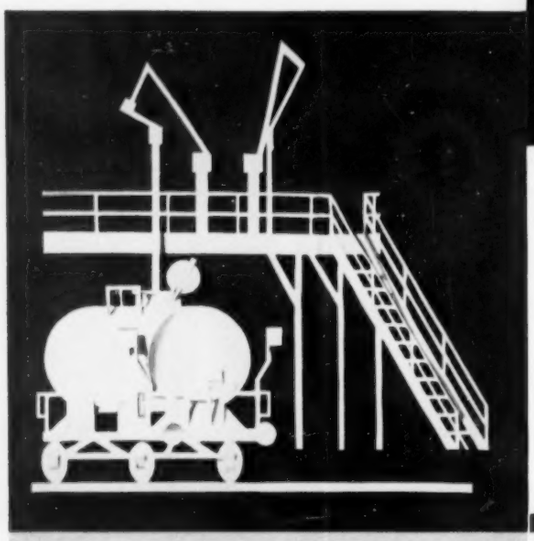

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CALTEX PETROLEUM PRODUCTS

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Whose cheese is being divided?

TWO cats could not agree on fair division of a tasty cheese. "Let's go to the monkey," said one, "He is all-wise and can divide our cheese fairly." So to the monkey they went.

The monkey immediately broke the cheese evenly and judicially put the two pieces on the pans of his balance. But one was slightly heavier. He shrewdly nibbled that piece a bit and put it back on the scales. Now it was the lighter piece. So he bit off some of the other piece only to find it the lighter. Thus while the two hungry cats watched, the monkey kept taking bites of the cheese, first one piece, then the other, until finally the cheese had almost disappeared.

"What's left is too small to divide," sagely pronounced the monkey, as he popped the remaining fragments into his mouth.

Observers of the American scene see a direct parallel between the record of federal taxation and this ancient parable of the trusting cats, the greedy monkey and the cheese. Business and the individual citizen have been content to trust government to rule on the disposition of their earnings. And Uncle Sam keeps taking bite after bite out of the shares of both individual citizen and business.

Already government bites are so large as to severely penalize citizens and business alike. If allowed to continue, it will seriously impede further industrial progress and growth, stifle initiative and threaten the strength of our free enterprise system. Beware the day—goal of the socialists among us—when the monkey says, "What's left is too small to divide."

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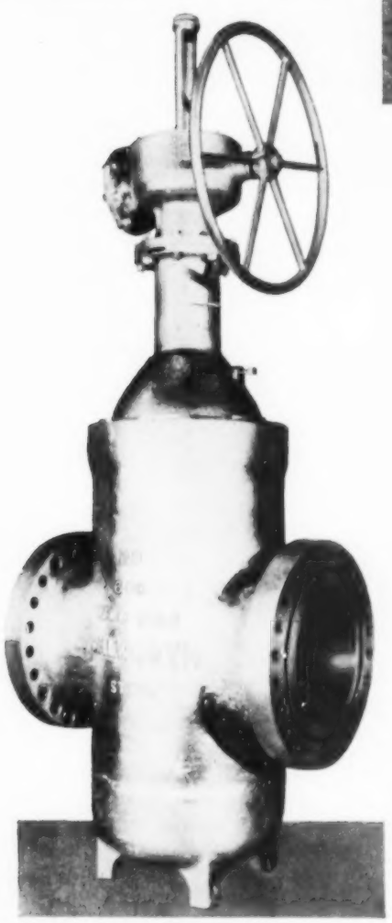
for Oil or Gas

THE PLATTE PIPE LINE COMPANY *has installed Walworth 20-inch Type 49 Cast Steel Pipeline Gate Valves in the main line from Worland, Wyoming to Wood River, Illinois. Illustrated is one of these valves at the Salisbury, Missouri station.*



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Walworth Type 49 valves are designed on the through-port principle, require no lubrication, and can be installed in a line without regard to direction of flow. Body and disc ports are accurately machined and have no dirt-accumulating pockets or obstructions to interfere with flow or passage of pigs and scrapers.

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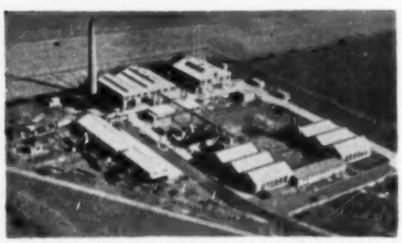

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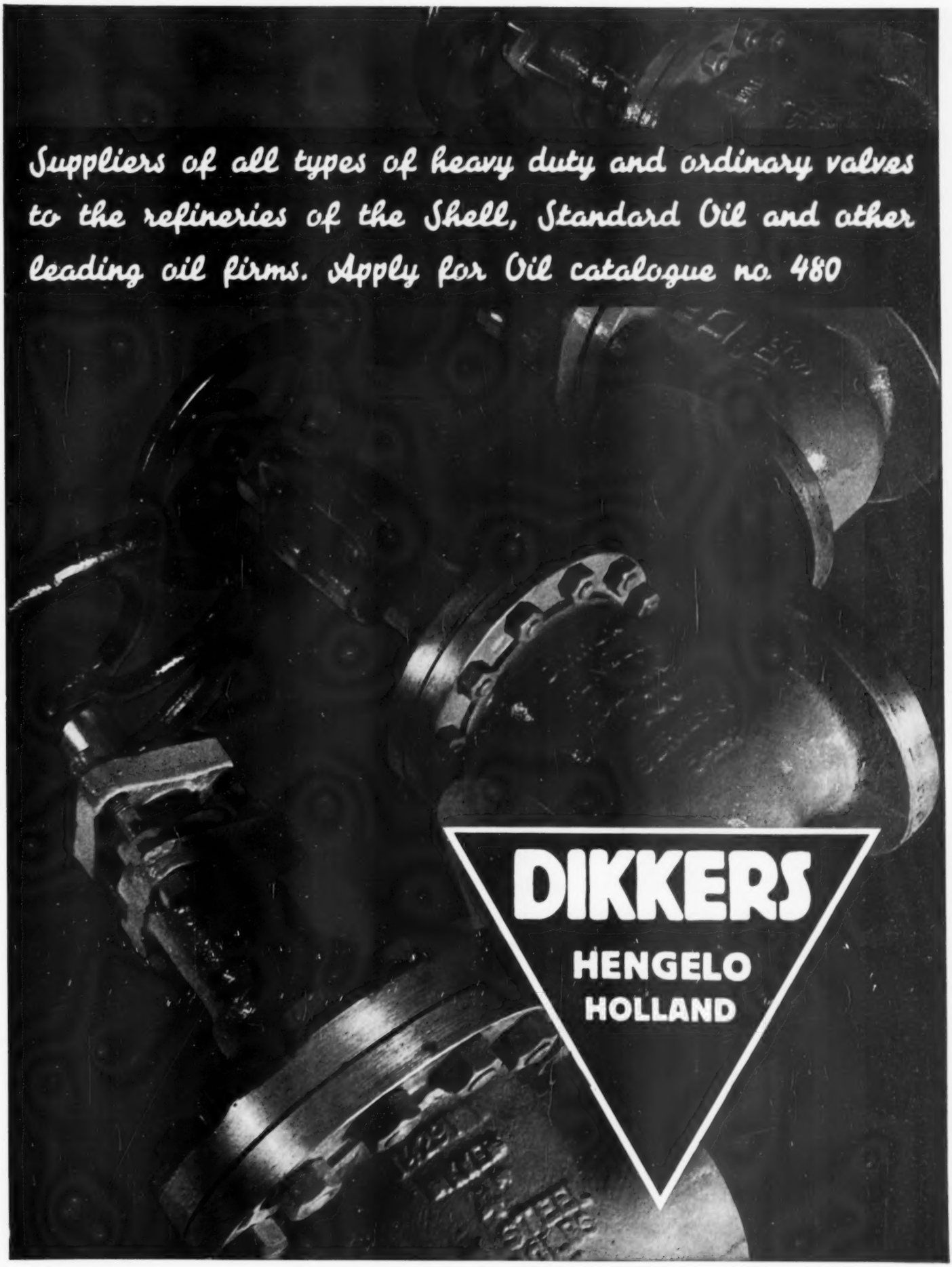
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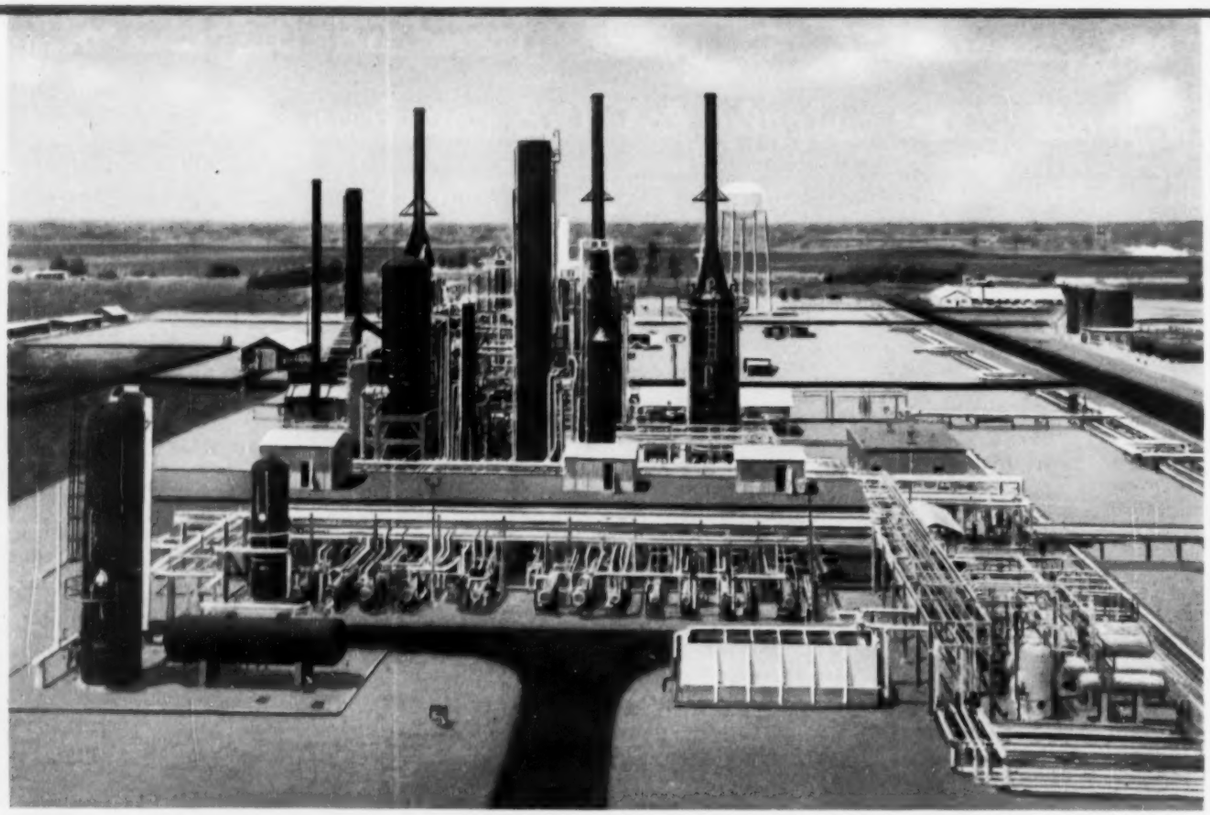

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Sarnia Refinery of Canadian Oil Refineries, Limited, is the first large, integrated refinery in Canada built for processing Canadian crude oil. It brings to this rapidly growing region the last word in technological progress in the field of petroleum refining. Such progress means better quality of product and greater efficiency in operation. Design and construction of the refinery were managed by Stone & Webster Canada Limited, utilizing the facilities of Stone & Webster Engineering Corporation.

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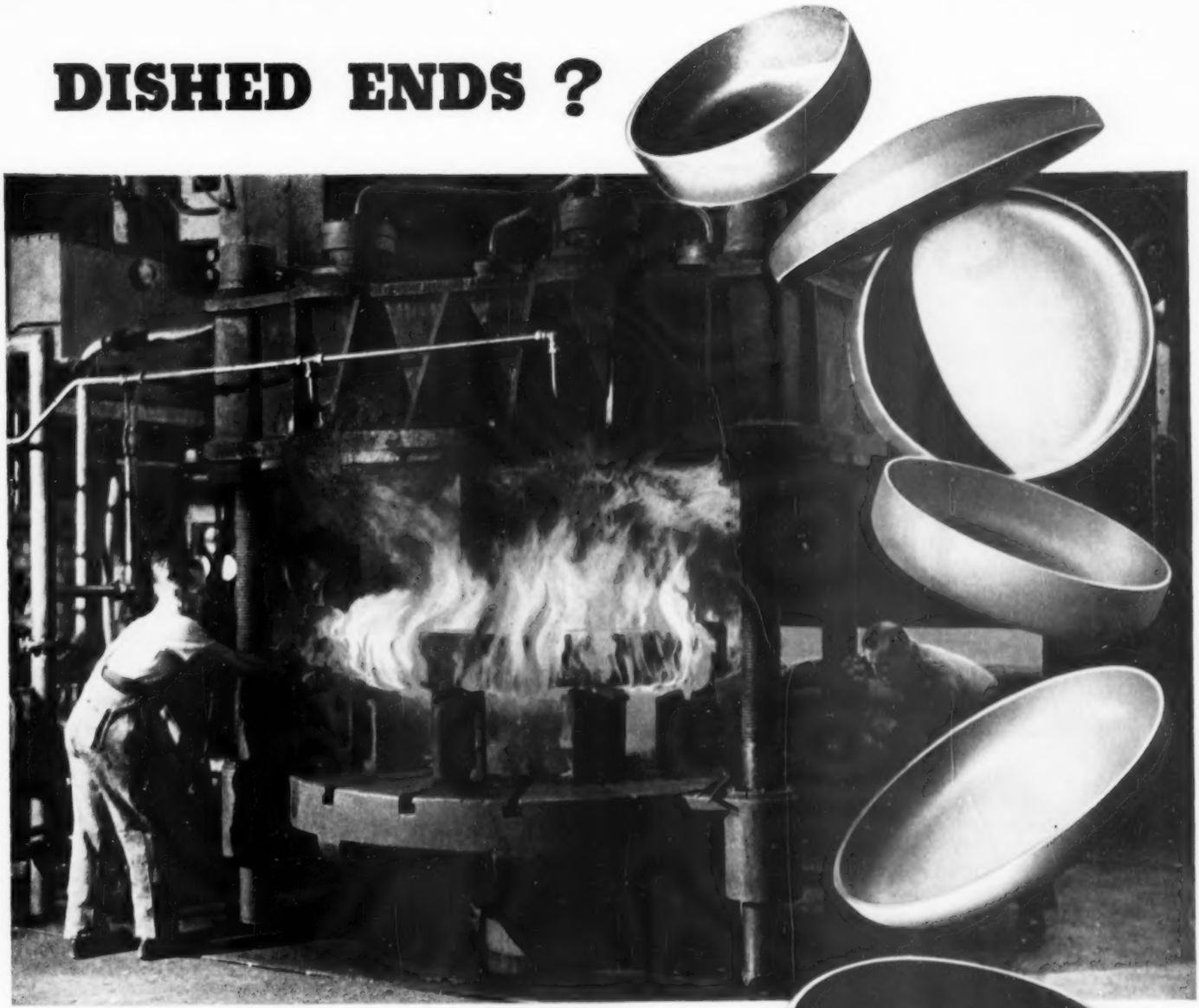

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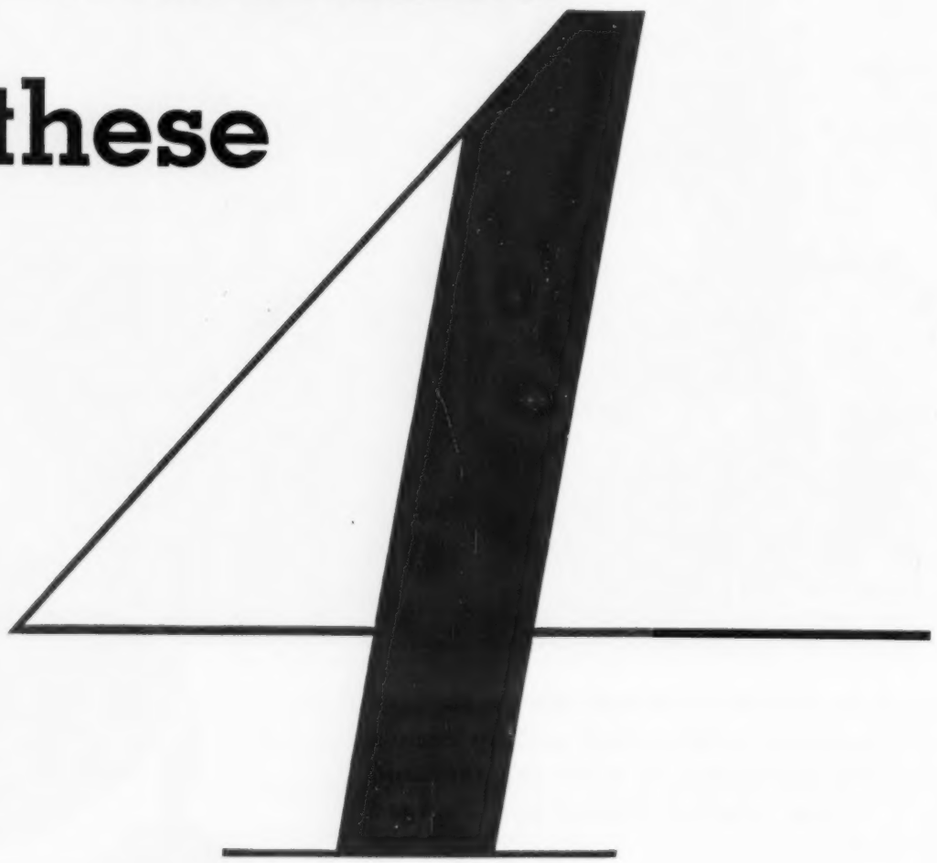

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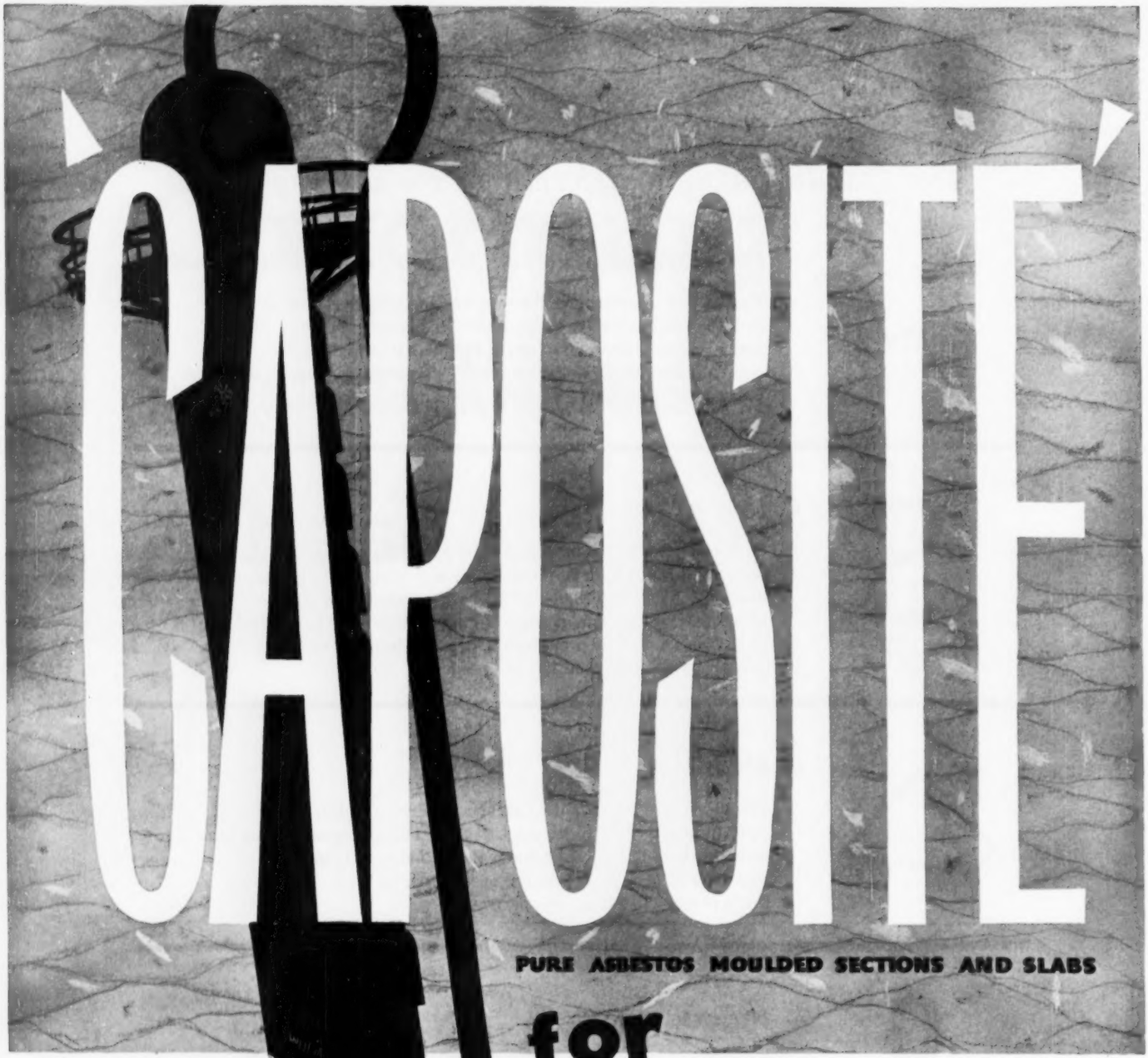

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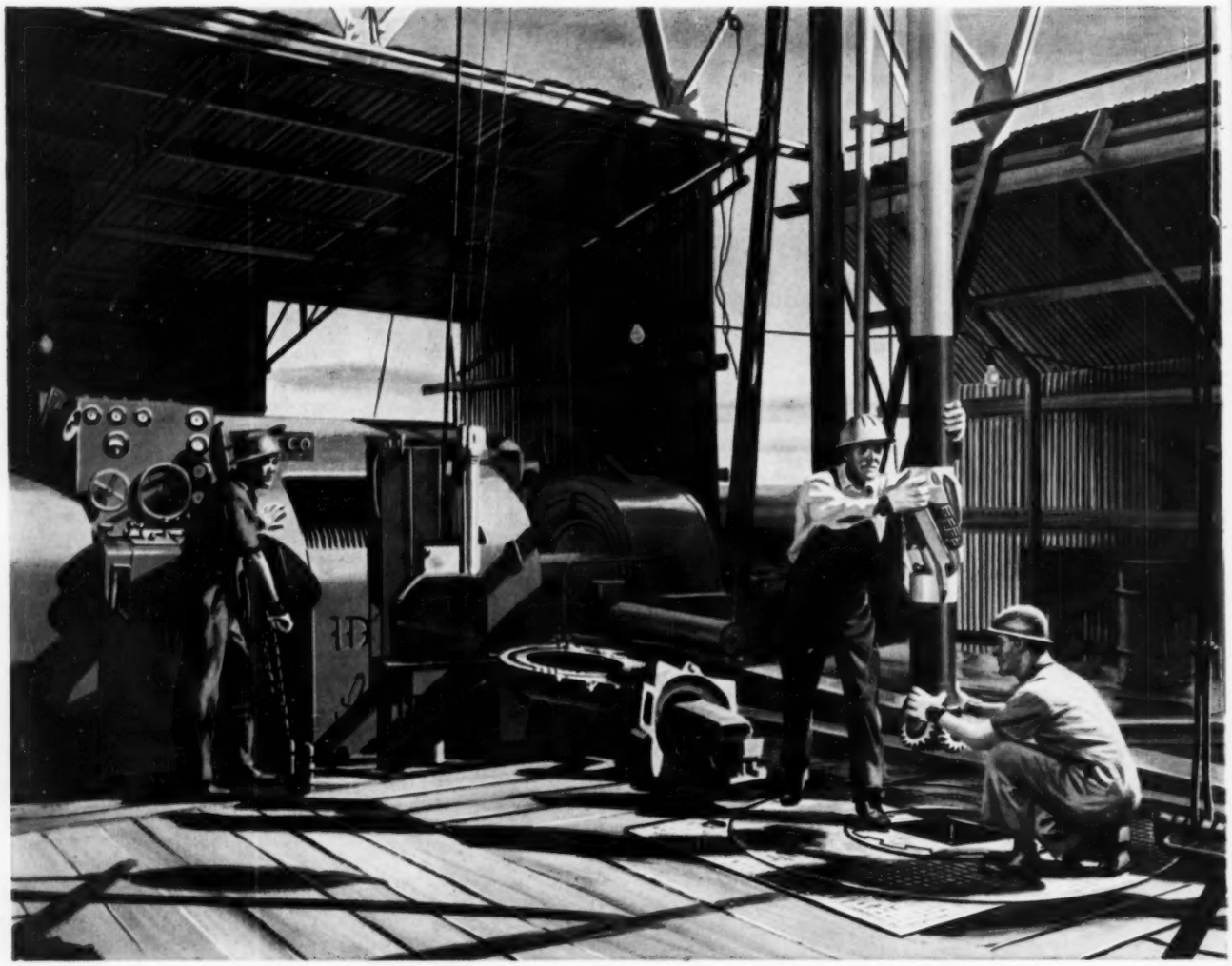

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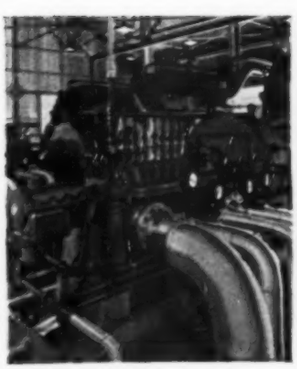
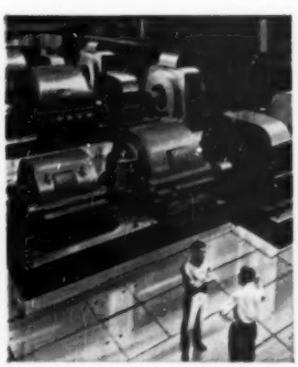


Pacific Pumps, Inc., *Huntington Park, Calif.* Centrifugal pumps, deep oilwell plunger pumps, hot oil and boiler feed pumps.



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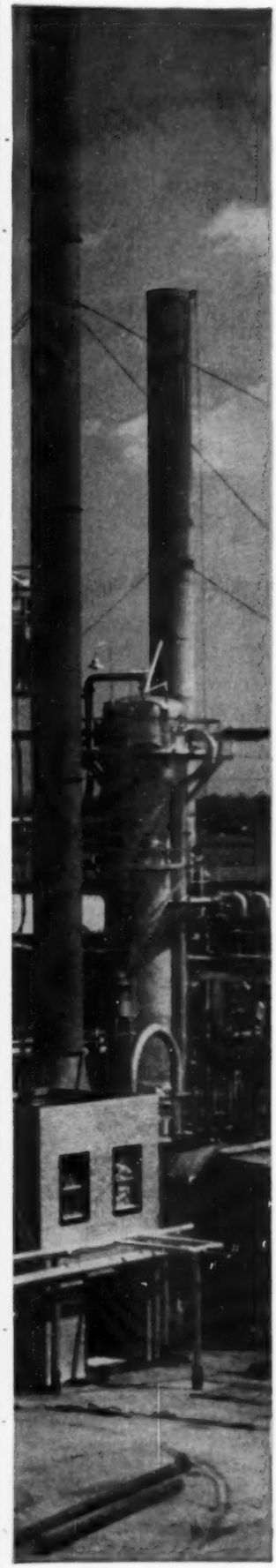

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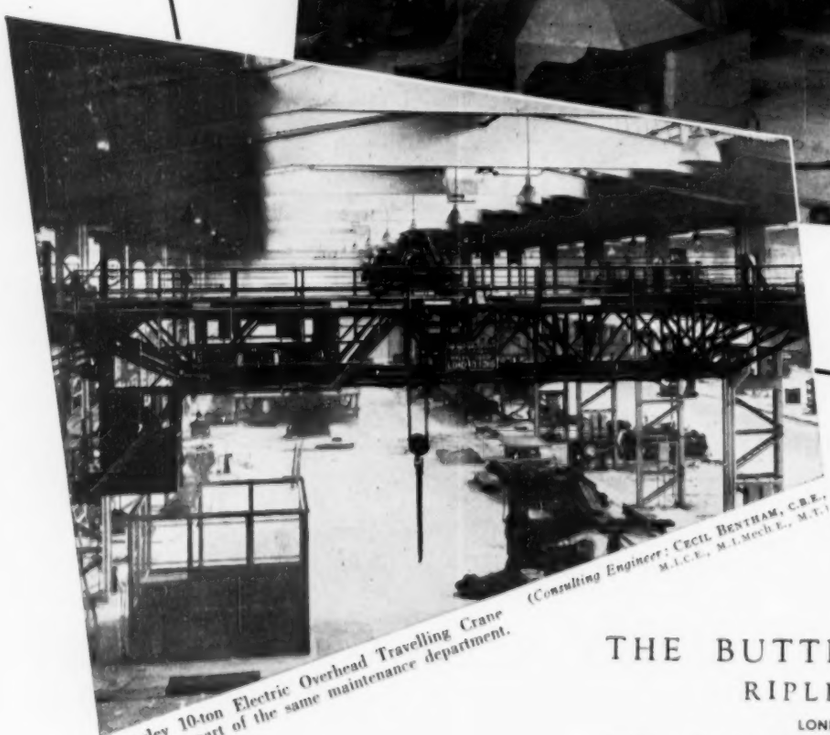

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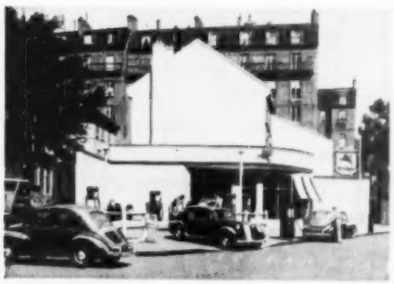

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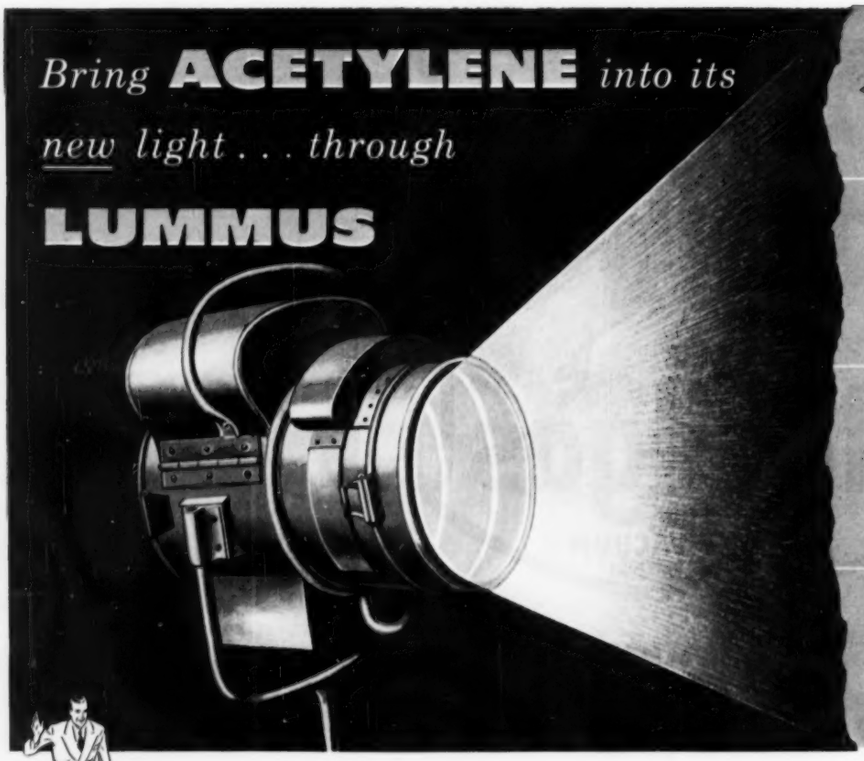

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THIS MONTH'S COVER

N. J. Parrino, staff photographer for Cities Service Company, has taken an interesting perspective view of a battery of pressure tanks at the Cities Service Gas Company compressor station at Greensburg, Kansas. The tanks are charged with compressed air for starting engines after inspection and maintenance shutdowns.

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PERPETUAL PROGRESS IN PRODUCTION IMPROVEMENT TECHNIQUES

YEAR 1953 PRESENTS FAVORABLE OUTLOOK

IN the year 1952 world production of petroleum was over 180 million barrels greater than in the twelve months preceding. Average production exceeded 12 million barrels daily for the first time in the history of the industry. These are impressive figures and suggest a healthy progress such as would be regarded as satisfactory by most industries operated on so broad a scale. On a percentage basis, however, the year's gain of 4.2 percent is less than half that of most other yearly periods since the end of World War II.

At the commencement of 1952, most of the statisticians and economists who make a practice of attempting to forecast probable supply and demand were in agreement that the astonishing increase of nearly 13 percent recorded in 1951 over 1950 was not likely to be repeated in the year then beginning.

Predictions of a five to seven percent increase were more commonly made, although the reasons advanced as likely to slow the pace of the rise were not exactly those actually responsible for the result. Perhaps the best explanation of the outcome of 1952 operations is to treat it as an example of the industry's ability to adapt itself to the requirements of the period, however these may vary.

Looking forward from the threshold of 1953 the consensus appears to be that the growth in demand and in production will be at much the same rate as in the year just ended, which would bring output up to a little more than 13 million barrels per day. This opinion is based upon the expectation that there will be a further improvement in economic conditions in a number of countries and no sharp increase in military requirements, both debatable assumptions. Some conservative members of the oil industry are concerned over the possibility of an oversupply of certain petroleum products. On the other hand, those who are charged with responsibility for providing security for the free world, so far as that depends upon petroleum, believe that there is still urgent need for intensified exploration and drilling to build up a safe reserve margin of available crude and for an active expansion of transport and processing facilities. Favoring well-sustained activity in all these fields is the prospect of a more abundant supply of essential materials which may permit the loosening of restrictions and controls heretofore in effect. Relief from some of the inequities of industry taxation is merely a hope.

While the conditions under which the oil industry must operate in some parts of the world are unsettled and the outlook clouded, members of the industry in the United States look forward with reasonable assurance to a more favorable political climate in which to operate. The incoming federal administration is committed to the relaxation or removal of industrial controls, except where these are required for national safety, and favors the encouragement of private initiative in the direction of business undertakings. The position publicly taken by General Eisenhower, during the presidential campaign, in favor of recognition of state authority over territorial waters, plus the previously demonstrated attitude of Congress, points to early action with probable stimulation of offshore drilling for which preparation is now being made.

Most lamentable development of the past year in its effect not alone upon the oil industry, but upon the international standing and influence of the United States has been the attack by the federal administration upon oil companies, American and foreign, engaged in international trade. The charges of monopoly, price fixing, and suppression of competition and particularly the effort to make a sensation through the manner in which they were brought out, provided just the fuel needed by every enemy of the nation to use against Americans and the American government with effects that are visible in both hemispheres.

This unsavory episode, combined with ill-advised efforts by the Department of State to interfere in petroleum affairs far beyond its jurisdiction, not only has had a damaging effect upon the legitimate activities of Americans abroad, but endangers the safety of the entire free world. Its impact and that of the recent attempts to impose State Department views upon other nations, cannot be overcome immediately, but a cessation of such activities may prevent conditions from becoming more aggravated.

On the whole, the outlook for the oil industry holds encouragement not only for a high level of activity, but also for better operating conditions during the year now begun.

World production higher

International requirements for crude petroleum were adequately supplied in 1952 and surplus capacity enlarged.

WORLD PRODUCTION of crude petroleum increased 4.2 percent to 12,286,900 barrels daily in 1952 according to estimates prepared by WORLD PETROLEUM on the basis of reports available in mid-December. The increase was almost evenly divided between eastern and western hemispheres. In the west, output rose 236,300 b/d, and in the east it rose 260,300 b/d.

Increases were much lower than in 1951 when crude production rose 1,363,400 b/d, or 13 percent. A much smaller rate of expansion was required in 1952 because of the lower rate at which demand was expanding. In the United States the consumption increase was 4.7 percent, approximately in line with the long-term trend. Outside the United States the rate of increase was higher in many areas. Total world consumption of petroleum hydrocarbons was somewhat in excess of 13 million barrels daily. Natural gasoline made up the difference between crude output and consumer demand. About 725,000 b/d of natural gasoline is manufactured by the international industry.

The United States produced 51 percent of the world's crude oil and was consuming more than 55 percent. Imports of crude and products into the United States increased 11 percent while exports were falling. Net imports in 1952 approximated 530,000 b/d.

Above-ground stocks of petroleum in the United States rose 45 million barrels in 1952 to 661 million barrels, equal to about 90 day's supply. Early in the year the stock of refined products was reduced sharply during the oil strike. At that time crude stocks were increased substantially. After the close of the strike, refineries stepped up their runs to meet anticipated demand for products, notably middle distillates. Fuel oil stocks were uncomfortable for a time during the steel strike. The industry's stock position at the close of the year was considered satisfactory.

The oil industry's program of 45,000 new wells drilled in the United States was met despite the steel strike at mid-year which restricted supplies of tubular goods.

The eastern hemisphere also had no difficulty in maintaining production at a high level despite the continued shutdown in Persia. Middle East production rose 145,100 b/d, or 7.4 percent, to 2,118,900 b/d.

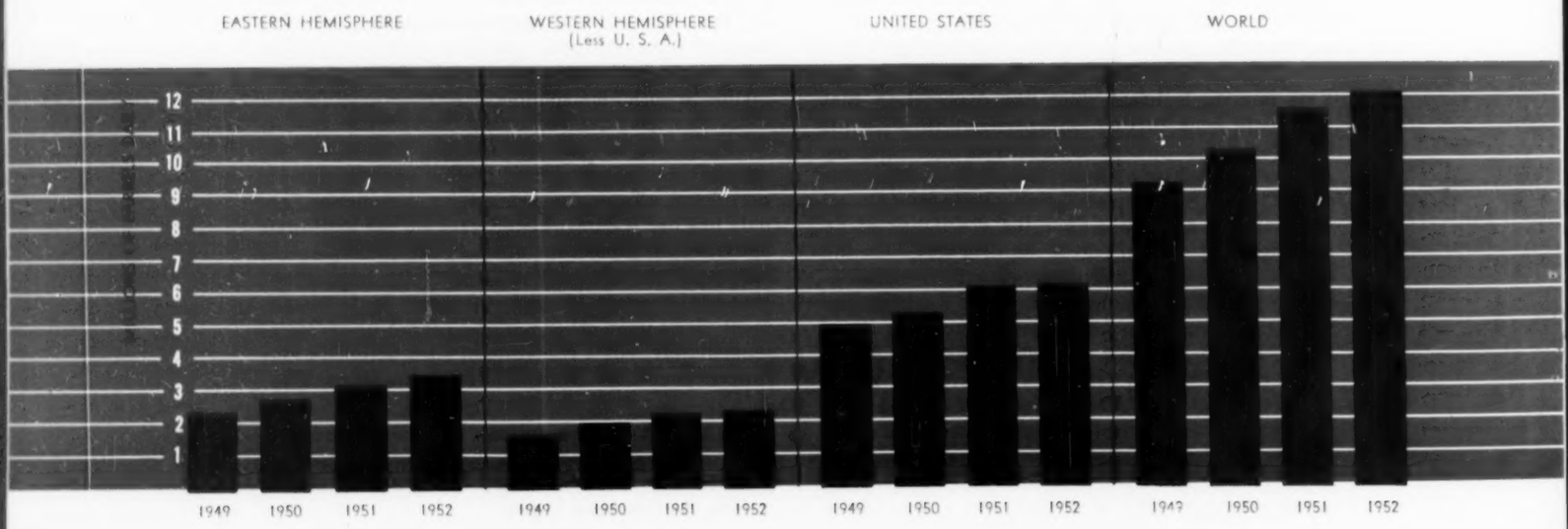
An important factor in this was the opening of the Zubair field at the head of the Persian Gulf by Basrah Petroleum Co. and completion of the new 30-32-inch pipe line from Kirkuk to Banias by Iraq Petroleum Co.

Zubair oil first entered world markets in the last days of 1951. By the close of 1952, output of the field was averaging nearly 60,000 b/d.

Opening of the IPC pipe line to the Mediterranean permitted the Kirkuk field to be operated more nearly in line with its potential. In October output was 443,000 b/d compared with around 170,000 b/d early in the year.

Kuwait production was a third larger in 1952 than in the previous year. In periods of peak demand output rose above 800,000 b/d. Average for the year was 750,000 b/d. The new Magwa field discovered in 1951 was made the scene of additional drilling this year as step-out wells were put down to ascertain how great the producing area may be. Wells drilled in the shaikhdom totaled 22 during the year. Total on December 31 was 140. Further studies of the Burgan field plus the Magwa discovery have caused Kuwait Oil Co. engineers to increase their estimates of reserves. Present estimate is "more than 12 billion barrels." Previously the estimate had been nine billion barrels.

Operations in Saudi Arabia have been routine in character during the past year. While geophysical reconnaissance has been active, no new wildcats have been drilled by Arabian-American Oil Co. Drilling



was restricted to 42 development wells in the eight known fields in the kingdom. At the close of the year 133 wells were being produced, including three gas wells, and 58 shut in. Of the eight fields, four were producing and four shut in awaiting greater demand for crude.

As was the case in other flush areas of the world, production in Saudi Arabia in 1952 fluctuated from month to month according to demand. Highest production was reached in June when output averaged 899,000 b/d. Late in the year the wells were pinched back to about 750,000 b/d.

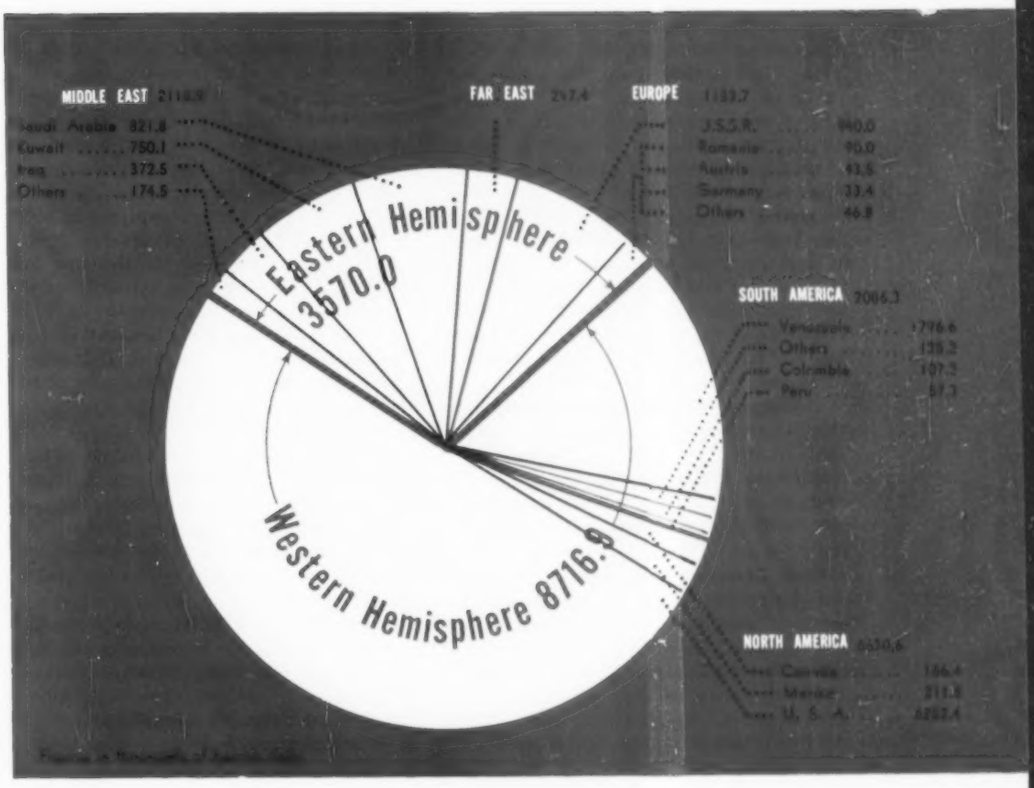
Egyptian operations were static during 1952 as the government has not yet changed its attitude to encourage foreign investment. In the first half year, eight wells were drilled of which four were dry holes and four producers. National output continued unchanged at about 45,000 b/d. More than half of the production came from the Ras Gharib field discovered in 1938. Most of the remaining oil was produced by the newer Asl and Sudr fields in the Sinai region. Three dry holes were drilled early in the year in the Sudr field which now is producing about 5,000 b/d from five flowing wells. Asl was turning out 15,000 b/d from six wells. One oil well and one dry hole were drilled in Asl in the first half of 1952.

Farther east, in Oceania, the Minas field in central Sumatra was brought into commercial production during the first half of 1952 by Caltex interests. Since an outlet was provided for, the field output has been at the rate of about 20,000 b/d. Drilling has been active throughout the year, with 35 new oil wells completed. At the end of the year the total of producing or producible wells was 62.

Aside from the Minas field there has been little change in Indonesian production. Shell has been unable to return to north Sumatra because of political disturbances and has not yet recovered all of its prewar properties in Java. Shell was producing 12,100 b/d from the Kawengan field in Java, but others were shut in. South Sumatra fields operated by Standard-Vacuum and Shell were producing 130,000 b/d, about the same as the previous year. In the 18 producing fields in which it operates in South Sumatra, Shell drilled 21 oil wells and one dry hole in the first half of 1952. Five rigs were running. Kalimantan drilling also was at a low level and combined output of six fields only 14,500 b/d.

Crude production in British Borneo has increased moderately during the past year. In Brunei, production at midyear was averaging 103,000 b/d compared with 101,000 b/d in 1951. Sarawak output was unchanged at 1,000 b/d.

Shell interests drilled 13 wells in Brunei during the first half year, of which 12 produced oil and one was dry. On June 30, 1952, there were 280 wells, of which 104 were flowing, 43 pumping, 56 on gas lift and 77 shut in. In the older Sarawak field, a thousand barrels of oil was being produced from 334 wells of which 108 were pumping and 226 on gas lift. There were 279 shut in wells.



Operations still have not been resumed in Ceram.

In Netherlands New Guinea only one field is being produced commercially. The Klamono field, discovered in 1936, has been producing 4,600 b/d of 19 gravity oil from Miocene limestone encountered at 300 feet. There were 17 wells being produced and five shut in. The operating company NNGPM, owned jointly by Shell, Standard-Vacuum, and Caltex, has done no recent drilling in this field although it has been testing other prospects. Wildcats were drilling at mid-year at Tambuni and Klamogoen, and development wells were drilling in the Wasian, Mogoi and Klamoemoek fields previously discovered. The Wasian and Mogoi fields are capable of producing light oil of 46-48 gravity. One well is shut in at Wasian and four at Mogoi, with one development rig running in each field. Commercial production has not yet been undertaken.

Development of central Asian fields in the USSR has been highly successful during 1952, according to an announcement to the Communist Party Congress in October. Oil Minister Baibakov suggested that recent successes make it very likely that the 1955 goal of 1,400,000 b/d of crude will be fulfilled ahead of schedule.

Average production of Russian fields in 1952 was estimated at the party meeting at 940,000 b/d, an increase of 100,000 b/d, or 11.9 percent, over 1951. Eastern districts which were producing only about 70,000 b/d in 1940 turned out 470,000 b/d of crude in 1952. Most of the increase has been in the "Second Baku" which Mr. Baibakov revealed as producing currently 376,000 b/d. It is in this area that development will be most active during the three years remaining in the present 5-year plan.

Production from the Caucasus has been increased slightly, but still is well below the prewar level. Current output of the western and southern fields is about 410,000 b/d, compared with 404,000 b/d in 1950. Offshore drilling in the Caspian sea has helped maintain production. Secondary recovery work has been aggressive.

The Party Congress was told that turbodrills are being employed in over 40 percent of all wells. It was stated that this type of drill is successfully used in directional wells and at depths in excess of 15,000 feet. Exploration drilling is reported at five times the 1940 level and development drilling at 2.8 times the 1940 rate.

Russian satellite nations have been less successful in their attempts to build domestic oil production. Romania has claimed to be about in line with its program, but most observers believe that the increase achieved in 1951 as a result of secondary recovery work has now been lost and that output again is back to about

85,000 b/d and sliding. Peak production from Romanian fields was 170,000 b/d in 1936. No new fields have been discovered in recent years.

The only other satellite nation with substantial production is Austria, which currently is producing about 44,000 b/d. Combined production of other countries, including Hungary, Albania, Poland and Czechoslovakia, is about 18,800 b/d. This is supplemented, of course, by synthetic oil produced in Eastern Germany, Poland, and Czechoslovakia. Liquid hydrocarbon resources of the Soviet bloc are currently held to be about 1,100,000 b/d and increasing.

Development of the Schoonbeek field in the Netherlands continued steadily during 1952. Drilling was sufficient to keep output at the 1951 level. In the first half year, 20 oil wells and four dry holes were completed. Two rigs were running at midyear.

West German producers were particularly active in trying to bring domestic crude production up to the nation's requirements. In August, for example, footage drilled totaled 134,000 feet, of which 34,700 feet was in exploratory drilling. At the end of August there were 2,259 wells in Germany, producing about 35,000 b/d. By districts, there were 1,500 wells in Hannover, 400 in Emsland, 199 in Schleswig-Holstein, 137 in Baden, and 23 between Weser and Ems. In September the Hannover district was producing 16,000 b/d and Emsland 15,000 b/d. Holstein-Hamburg was producing 2,800 b/d. The Hohne field in the Hannover district increased its output 140 b/d in September over August's 2,000 b/d.

French crude production continued to rise during 1952 as the Lacq field was further developed. Discovery was made in December, 1949 in Cretaceous sands at about 2,200 feet. National output in 1951 was more than double that in 1950, rising to 5,400 b/d. Another 2,000 b/d was added in 1952, bringing national output to above 7,000 b/d. The old Rhine Valley Pechelbronn fields continue to yield about 1,000 b/d. Geophysical and geological reconnaissance work has been carried out in the sedimentary basins of southern France in search of another Lacq.

In the western hemisphere, Canadian operations continued to be a center of interest. Production of the Dominion increased 27.6 percent over 1951 to 166,400 b/d. It is estimated that producing capacity at MER was in excess of 275,000 b/d at midyear and probably about 300,000 b/d by the end of the year. The lack of an outlet to the Pacific Coast and the seasonal character of deliveries from the eastern terminus of the Interprovincial Pipe Line tended to keep output below MER even though Canada was forced to import large quantities of oil. Completion of the Trans Mountain pipe line to British Columbia and Washington state will assist greatly in permitting a greater production from the prairie province fields.

Saskatchewan has had some interesting discoveries in 1952 to join those continuing to be made in Alberta. The Fosterton area in the Canadian portion of the Williston basin is being developed to the point where a pipe line will be economically justified. Another discovery near the U. S. border is to be further explored in 1953.

Outstanding event in Mexico during 1952 was discovery of the Ordonez field which is looked on as an extension of the Golden Lane, first discovered in 1903. Several wells have been brought in with potentials of about 5,000 b/d. It is anticipated that the field can produce about 50,000 b/d within a few months after a pipe line outlet is provided. The field is badly needed to supplant declining output at Poza Rica and help Mexico supply its rapidly growing domestic needs for oil. Pemex itself and a number of American companies operating under special contracts are diligently searching for new oil in Mexico.

Colombia increased its crude production moderately in 1952, largely as a result of development of Shell's Yondo concession. The Casabe field was producing about 40,000 b/d compared with 37,000 b/d the previous year and 25,000 b/d in 1950.

Good promise for future expansion of Colombian output is seen in the Cretaceous discovery in the Magdalena valley made by International Petroleum Co. Fairly good wells were found in the upper Cretaceous and the company then moved in heavier equipment to test out lower horizons similar to those which have given prolific results in Venezuela.

The steady increase in Venezuelan production continued through 1952. Average output for the year was 1,796,600 b/d, compared with 1,704,643 b/d in 1951, and 1,497,985 b/d in 1950. Venezuela supplied 14.6 percent of the world's crude oil in 1952, compared with 14.4 percent in 1951.

At the close of the year there were more than 11,000 producing oil wells in Venezuela yielding an average of 164 b/d. Well over 100 rigs were running and completions averaged 16 per month. In the first ten months, 147 oil wells and 10 dry holes were completed.

Production in Peru has been somewhat static in recent years because no new concessions were being taken. The recent government action in opening oil lands again resulted in the filing of requests for concessions covering large areas. It is assumed that geophysical and geological studies will be carried out in the next few years.

The world's producing record for 1952 again exhibits the efficient way in which the oil industry is able to meet civilian as well as military requirements for liquid hydrocarbons. Producing capacity of the western hemisphere is well above immediate needs and the Middle East also has large quantities of oil available for immediate use in an emergency.

WORLD CRUDE OIL PRODUCTION

(Thousands of Barrels Daily)

	1939	1950	1951	1952
North America				
United States	3,465.7	5,407.0	6,149.0	6,252.4
Canada	19.1	78.3	130.5	166.4
Mexico	162.0	199.0	210.2	211.8
Total	3,646.8	5,684.3	6,489.7	6,630.6
South America				
Venezuela	567.0	1,498.0	1,704.6	1,796.6
Colombia	65.5	91.0	105.3	107.2
Argentina	51.0	64.0	66.9	67.0
Trinidad	52.8	56.5	57.1	57.3
Peru	37.1	41.2	44.0	44.6
Ecuador	6.3	7.2	7.4	7.8
Bolivia	0.6	1.7	1.4	1.5
Cuba	0.3	0.3	0.3	0.1
Brazil	—	0.8	1.9	2.2
Chile	—	1.7	2.0	2.0
Total	780.6	1,762.4	1,990.9	2,086.3
WESTERN HEMISPHERE	4,427.4	7,446.7	8,480.6	8,716.9
Europe				
Romania	128.5	88.5	100.0	90.0
Austria	11.7	28.4	44.0	43.5
Germany	12.3	21.6	26.5	33.4
Hungary	3.0	11.5	10.5	9.5
Poland	10.7	3.3	3.7	3.9
Netherlands	—	13.4	13.6	13.7
Albania	2.5	3.0	3.0	3.0
France	1.4	2.5	5.6	7.0
French Morocco	—	0.8	1.6	2.0
United Kingdom	0.1	0.9	0.9	1.1
Czechoslovakia	0.2	0.8	1.9	2.5
Yugoslavia	—	2.6	3.2	3.2
Italy	0.2	0.2	0.4	1.0
Total (excluding USSR)	170.6	177.5	214.9	213.7
USSR	603.0	760.0	842.0	940.0
Total	773.6	937.5	1,056.9	1,153.7
Near & Middle East				
Iran	214.0	665.5	350.0	31.5
Saudi Arabia	10.8	546.7	761.5	821.8
Iraq	84.5	136.2	174.6	372.5
Kuwait	—	345.0	563.0	750.1
Behrein	20.8	30.0	30.0	30.0
Qatar	—	33.7	49.6	67.3
Egypt	12.8	45.3	44.7	45.2
Turkey	—	0.2	0.4	0.5
Total	342.9	1,802.6	1,973.8	2,118.9
Far East & Oceania				
Indonesia	170.0	132.5	151.7	168.7
British Borneo	20.0	84.8	103.0	104.8
New Guinea	—	4.8	4.8	4.6
India	28.0	5.3	5.3	5.2
Pakistan		3.5	3.6	4.1
Burma		1.6	2.2	2.2
Japan	7.3	5.6	6.4	5.8
China	—	2.0	2.0	2.0
Total	225.3	240.1	279.0	297.4
EASTERN HEMISPHERE	1,341.8	2,980.2	3,309.7	3,570.0
WORLD TOTAL	5,769.2	10,426.9	11,790.3	12,286.9

PERCENTAGE DISTRIBUTION OF PRODUCTION

Principal Nations	1939	1950	1951	1952
United States	60.0	52.0	52.2	51.0
Venezuela	9.8	14.4	14.5	14.6
USSR	10.5	7.3	6.9	7.4
Iran	3.7	6.4	2.9	—
Saudi Arabia	0.2	5.3	6.5	6.7
Kuwait	—	3.3	5.0	6.1
Iraq	1.5	1.3	1.5	3.0
Western Hemisphere	76.7	71.5	72.1	71.0
North America	63.2	54.6	55.1	54.0
South America	13.5	16.9	17.0	17.0
Eastern Hemisphere	23.3	28.5	27.9	29.0
Middle East	6.0	17.3	16.8	17.2
Oceania & Far East	4.1	2.3	2.3	2.4
Europe (Including USSR)	13.2	8.9	8.7	9.4

STATE DEPARTMENT ATTEMPTS IRANIAN OIL SOLUTION

WASHINGTON

AGITATION IN WASHINGTON diplomatic circles with repercussions from London and the Middle East resulted early in December from the latest attempts of the State Department to interject itself into the Iranian oil tangle in the long-standing stalemate that has kept Persian oil out of the world's markets.

The first flurry was caused by the unexpected announcement put out through the press division of the department on December 6 which said in plain terms that Americans were at liberty to purchase oil from the Iranian government if they were prepared to assume the risk of being sued for such action. Considering that the British government had published far and wide the statement that such shipments were stolen property and that recipients would be prosecuted, this qualification was hardly necessary except to clear the United States government of responsibility.

While officials of the State Department always have been extremely polite in referring to the seizure of British property as "nationalization," and no public statement on the subject of possible private deals in Persian oil had been published, it was commonly understood that would-be purchasers who made inquiries in Washington had been discouraged from engaging in such traffic on the ground that it might interfere with an amicable settlement of the dispute. The sudden announcement of what was interpreted as a reversal of policy, coming at a time when the question was not attracting particular attention and when the first suit involving the shipment of Iranian oil was under court consideration, gave rise to much speculation.

It was hailed by the operators who had been attempting to arrange purchases at cut rates as a "green light" to go ahead with their plans. It was received with evident astonishment by British officials, who made no comment, though the British press and public were less restrained. Among those individuals in Washington who claim always to have "inside information," it was explained as a notice to the British to make a fresh and prompt attempt at settlement with Iran.

The second chapter in this somewhat astonishing affair came with the revelation that the Secretary of State and members of his staff had entered into discussions with officials of American companies in an endeavor to induce them to undertake to rescue the Persians from the pit which they had dug for themselves. According to a report published on what was stated to be good authority, a plan put before these companies proposed the organization by the group of a corporation to purchase and market Iran's oil, sharing income on a 50-50 basis, and with Britain undertaking to handle a portion of the oil through her own market outlets. An integral feature of the plan, as reported, was a loan to Iran by the World Bank to enable that country to pay the former owner (the Anglo-Iranian Oil Company) for the property taken over.

Several practical objections to this handsome program have been pointed out by American oil men, aside from their understandable objection to becoming involved in an undertaking of this sort, which might suggest to other nations the advantages of violating their agreements and seizing other oil properties if the practice were to be so generously rewarded. Some of these handicaps are:

(1) There is no present need or market for Iranian oil such as existed at the time when it was forcibly taken from its owners. To make a place for it would mean a cutting down of production in other countries, a procedure that would be violently resisted by these nations as it would greatly reduce their own revenues.

(2) To restore the Iranian industry to anything like its former dimensions would require a tremendous investment with no assurance that confiscation would not be repeated when restoration was attained.

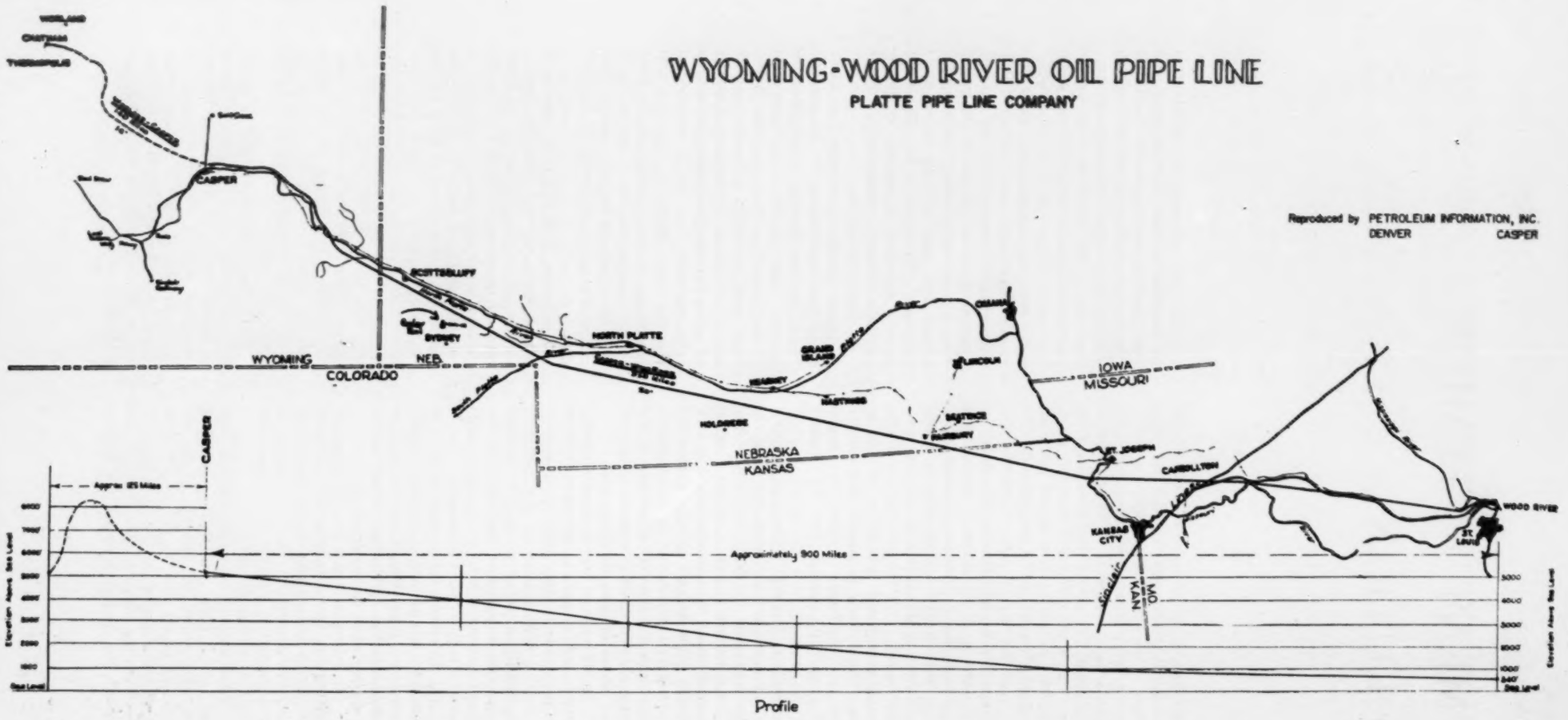
(3) A loan to Iran to be used in paying the British for their properties probably would be unacceptable to Dr. Mossadegh and his supporters. Their demand is for the immediate advance of a huge sum with no strings attached.

When questioned on this reported project at a press conference, Secretary Acheson denied its accuracy to the extent of saying that he never had given any consideration to the formation of an operating company. The Secretary did admit that he had discussed the Iranian situation with oil company officials, that he intended to have further talks with them, and intended to go over the matter with Secretary Eden on his forthcoming visit to Paris. Such a discussion did take place during the NATO meeting, but according to reports, Britain's representative was decidedly cool to the whole project. The only announcement made was that no agreement was reached. Paul Nitze, State Department planning chief, was sent to London to discuss the matter with British officials, but returned after a very brief stay with no statement of progress. Persisting in its efforts, the State Department is reported moving to approach Premier Mossadegh through Ambassador Henderson.

Iranian Ambassador Allah-Yar Saleh, at a press conference in Washington, stated that the Embassy appreciated the position taken by the State Department of the United States in ruling that Americans were at liberty to handle Iran oil, which he regarded as definitely disposing of claims that the government discourages such shipments. As for the warning of possible legal attack, he observed that anyone can bring a lawsuit at any time, for any reason, but that in attempting to stop oil shipments by such means, "any respectable court will decide in favor of Iran."

The feeling in Washington, outside of official circles, is that there has been a serious lack of coordination in the treatment of questions of foreign oil by the Truman administration. It is known of course that the Federal Trade Commission report which served as basis for the "cartel" suit was kept secret for many months by apprehension of the State Department that its publication would be injurious to the foreign relations of the United States. As the government itself has revealed, the release of the report and the order to bring suit against the international companies was forced by the President's order.

While the State Department is apparently promoting joint oil company action to handle Persian oil, the Justice Department has bitterly opposed company cooperation even to meet a national emergency. A unified and definite federal policy is generally held to be a most immediate need.



The Platte Pipe Line

By Tom Dougherty

Staff Writer, Petroleum Information, Denver-Casper

Millard K. Neptune, president of the Platte Pipe Line Company.

Ralph F. Moore, vice president in charge of operations for the line.

AVAILABLE petroleum resources of the United States are today 100,000 barrels per day greater than they were a few weeks ago. The reason: the 1,056 mile Platte Pipe Line from Wyoming to Wood River, Illinois, is completed and in operation. The new line is the key which has unlocked the surplus of crude production in the Rocky Mountains, a surplus which easily amounts to 100,000 barrels per day.

The region's oil production has climbed steadily in recent years, reaching a point some time ago which was significantly in excess of the demands for crude within the regional market. Transportation to other market areas on a competitive basis became a necessity for the continued growth of the Rocky Mountain region's oil industry, and consequently the continued growth of the regional economy. Thus the Platte line may be ranked as the greatest economic development for the Rocky Mountain region since the coming of the railroads.

The Platte line is not the first to be built from the Rockies to markets in other areas of the nation, but it is the first to be built with the objective of providing an outlet for production, rather than for supplying the refining needs of a processor and marketer in a particular area. Completion of the line has made possible, for the first time, the movement of crude from the Rockies at a cost which will permit it to be priced in the consuming area at a figure which is competitive with Texas and Mid-Continent crude oil.

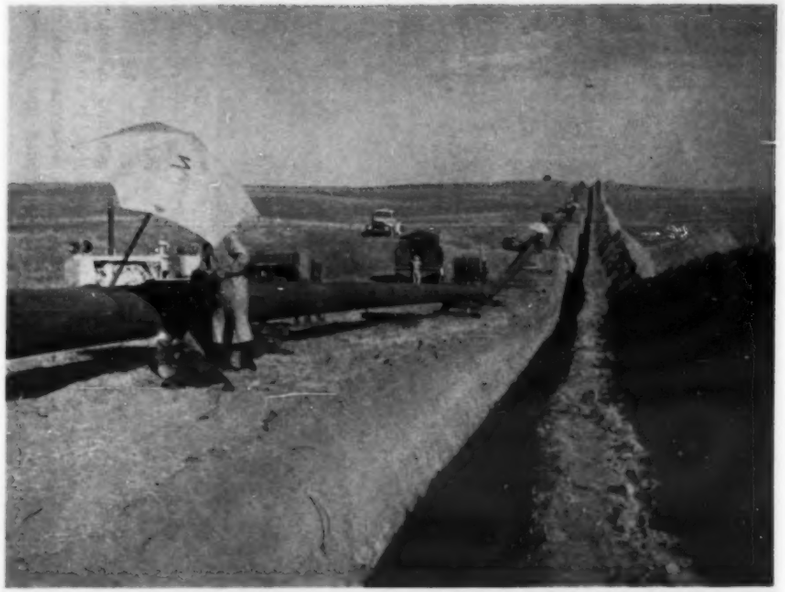
A large and ever-increasing portion of the region's basic economy is based on oil production. Despite the early development of agriculture, the large, once-flourishing mining industries of the region, and the currently developing industrial potential, oil has come to a position of dollar value ascendancy in the area, particularly in some of the major producing states such as Wyoming.

The first period of significant development of the oil possibilities of the Rocky Mountains came to a near standstill in the early 1920's. It was choked by lack of competitive transportation to markets which could absorb the volume of oil produced. During early development of the region, rail transportation sufficed to move the production from Rocky Mountain fields and the products of the region's refineries. With the discovery of large fields in the Texas and Mid-Continent areas, the competitive position of the Rocky Mountain producer was lost, and the development of the region languished.

This period of economic cramps persisted during the thirties and forties with expansion geared primarily to regional consumption. The exploration done during those years, however, disclosed increasing promise, and at the end of World War II a new and vigorous campaign to develop petroleum prospects began. Despite an increasing demand within the Rocky Mountain states, a surplus of producible oil considerably in excess of any possible regional take was soon developed. Meanwhile an unsaturated market existed in the midwest. The nation, with defense geared to petroleum and its products, clamored for a readily available reserve of production in the event of national necessity.

Prior to the present increase in activity and interest, several producers within Rocky Mountain states had developed sizeable crude reserves, as noted above. The increasing demand for petroleum products which followed World War II, with the phenomenal growth of domestic consumption, led to a careful examination of the possibilities of getting Rocky Mountain crude to large markets. The only apparent answer was a new pipe line outlet, with rates permitting competitive sale of oil at the terminal. It was important also that the new line be a common carrier in the true sense of the word in order that the continuing development and exploration of the region might be based on the efforts of many companies and individuals who would have no particular incentive for exploration and development without the assurance of low cost transport of production to stable markets.

The cost of such a line when surveyed by a single company, or a combination of only two or three companies, was considered prohibitive. A greater combination of major producers was apparently the only practical solution to the problem of



Above, welding crew in operation on the plains of central Nebraska and below, one of the spreads at work in the rolling Missouri countryside.

transportation. At the time of the beginning of plans for the Platte line the surplus of production existing in the region was estimated between 50,000 and 75,000 barrels per day.

Accordingly, five companies with extensive production in the region combined on the pipe line project, and in August of 1950 the Platte Pipeline Company was organized. The companies represented and their respective holdings in the company are: Ohio Oil, 25 per cent; Sinclair Pipe Line Company, 25 per cent; Continental Oil, 20 per cent; Pure Oil, 15 per cent; and Toronto Pipe Line Company (British-American Oil Producing Co. subsidiary), 15 per cent.

The combined ownership of no two of the companies is sufficient to give them control of the operations of the Platte Pipeline Company. The common carrier intent of the construction of the line is thus reasonably protected. The cost of the line approximated $60,000,000. The organizing companies provided $6,000,000 of this amount and the remainder was procured through the sale of $54,000,000 worth of 3⅜ percent 25-year first mortgage pipe line bonds to the Metropolitan Life Insurance Company and the Mutual Insurance Company of New York.

The line was designed as a peace-time project, with the intent of serving increasing normal needs of the midwest market area. Intention of the companies to build the line was announced before the beginning of the war in Korea. What had been a tightly drawn schedule based on a plentiful supply of materials was adjusted to the steel shortage which was born with the war.

Eight spreads were planned for the line. The resumption of a partial war-time footing and the imposition of the controlled materials plan which operated to the disadvantage of the one-time-only user of high priority materials slowed the flow of steel so that the eight spread operation was never obtained.

Steel which was to have been delivered in the first two quarters of 1951 was rescheduled for delivery during the first two quarters of 1952. The steel strike in the summer of 1952 slowed supplies further, so that the final deliveries were made in mid-October. During the latter part of construction, pipe was taken directly from trucks in many instances for immediate use in the laying operation.

Extension of pipe deliveries over a period of a year and a half enabled one spread to lay a total of 549 miles of the line, which is believed by management to exceed any previous spread record for continuous laying.

So closely did material deliveries parallel the work of active spreads that the final weld was made only one day later than predicted on the basis of pipe deliveries as scheduled from the mills.

Initial planning and design of the line was by an engineering committee with personnel from all the participating companies. Much of the detail engineering, the purchase of materials and right of way acquisition was a function of Sinclair Pipeline and Sinclair Refining. Key men from Sinclair and from some of the other companies were loaned or permanently transferred to the Platte company.

The line will handle three separate grades of oil. A low gravity sour crude stream produced principally in the big Horn and Wind River basins of Wyoming, a sweet crude stream from eastern Wyoming and the Denver-Julesburg basin of Colorado and Nebraska, and a third stream of intermediate classification will be handled. This third stream will have a sulfur content slightly above the sweet crude maximum, and be free of hydrogen sulfide.

Connections with other pipe lines which can carry oil to the refining centers of the Lakes region and further east are provided at Salisbury, Missouri, and at Wood River. Principal destinations for Platte line shipments are Wood River, Chicago, Bayshore (Toledo), and Earhart (Detroit), with some shipments to points further east also practical.

The reduction of tariffs, a basic purpose of the Platte line, was accomplished by the use of every proven modern innovation in design, with a control and maintenance system aimed at the utmost in efficiency.

The completed system includes 126 miles of 16-inch line from the Chatham station in the Big Horn basin of Wyoming to Casper. This section of the line crosses the Big Horn mountains at an elevation at 6,300 feet, then drops a thousand feet to the one mile elevation at Casper. From Casper east the line is of 20-inch diameter for the remaining 932 miles of its length. The 20-inch portion of the line has the steepest and longest downhill gradient of any major pipeline system now in operation. The Casper end of this section is nearly a mile above the Wood River terminal.

A calculated flow of 40,000 barrels per day is obtainable by gravitation. Shutdown of the line at the Wood River terminal would result in a static pressure of 2,000 pounds per square inch, considerably above the yield strength of the pipe, and sufficient to endanger the live operation of the line.

Control of the static head is effected by the installation of underpressure regulator valves, remotely controlled, which divide the static pressure into units of 300 to 400 psi. Two underpressure control valves and a pressure relief valve are installed in parallel in the line, and these are operated electrically, under remote control of the dispatcher in Kansas City. Pressures at the regulator stations are transmitted to the Kansas City office, and a complete alarm and fault warning system is tied into the control system so that information on any hazardous development is immediately transmitted to the controlling office in time to forestall serious damage which might be threatened.

The underpressure regulator system solves the problem of permitting shutdown of the line while still keeping it filled with oil. These regulator valves are installed at Yoder, Wyoming; Ogallala and Holdredge, Nebraska; Marysville, Kansas; and Gower, Missouri. They will close automatically in series when the line is shut down. Such a regulator station consists of two 8-inch air loaded S-type regulator valves which are connected in parallel with an air loaded relief valve. The relief valve will close at a pressure equal to the upstream static head at its point of installation, and the regulator valves will close at pressures from 10 to 20 psi higher than the relief valve pressure.

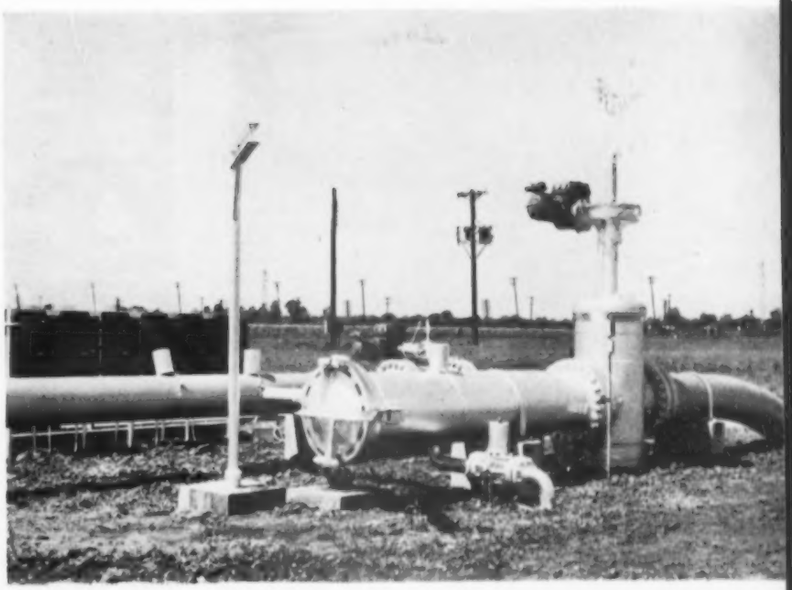
A typical shut-down operation would commence with shut-down of all stations with the exception of Casper. When Casper was shut down, following cessation of operations at other stations, the line pressure at Yoder would be lowered to the operating pressure of the two regulator valves, at which time these valves would close, allowing flow through the relief valve until pressure reached operating pressure of the relief valve. It would then close, holding sufficient upstream pressure to keep the Casper-Yoder line segment filled with oil. Subsequent stations would operate in similar fashion, allowing the line to stay full of oil, and preventing serious contamination between batches of various types of crude. Air problems are thus eliminated, and upon complete shut down of the line the static pressure is divided into increments which would not threaten yield strength of the pipe. Regulators automatically reopen when the upstream station resumes pumping, and the pressure is raised above closing pressure of the regulators.

Should the regulators fail to close and excessive static head be developed in the line, an emergency relief valve and bursting head will allow the line fill to flow into storage tanks at Salisbury.

Platte Pipe Line pumping stations are located at Chatham (the point of origin) and Casper, in Wyoming; at Ogallala, Nebraska; Marysville, Kansas; and Salisbury, Missouri. Pumping facilities at these main line stations are identical, with one 10-inch single stage, and three 8-inch single stage centrifugal pumps. These are powered by one 350 and three 800 horsepower explosion-proof electric motors. Layout provides for pump operation in series only, but any combination of one to four pumps may be used, with resulting pressures of 100, 300, 400, 600, 700, 900, and 1,000 psi. Use of the highest pressure bracket with present stations will produce a flow of 100,000 barrels per day.

The Chatham station employs five 12-inch duplex piston pumps of the horizontal type, powered by 200 hp motors. The station is capable of an input of 43,320 barrels per day using all five pumps with 4½

Dragline ditching for a small stream crossing on the eastern end of the line.



Scraper trap and valve operator at the Wood River, Illinois, terminal.

inch liners, producing a pressure of 1,225 psi.

The Chatham tank manifold accommodates one 55,000 and two 80,000 barrel tanks, with provisions made for line to tanks owned by companies operating in the area and for connection with gathering systems operating in this portion of the Big Horn basin.

The tank farm at Casper is the system's largest, with ten 120,000 barrel tanks, and one of 1,000-barrel capacity used as a truck unloader.

The Salisbury, Missouri station is similar to that at Casper, except that only two 120,000-barrel tanks are provided. The Sinclair Pipe Line Company's station at Salisbury can be connected with Platte facilities, allowing either company to pump into storage owned by the other. Two additional 155,000-barrel tanks are being constructed at the Sinclair station.

Injection stations have been built at Lost Cabin, Glenrock, and Guernsey, Wyoming, and at Gurley, Nebraska. Pumping facilities at these stations are designed for the injection of an expected volume of oil at pressures designed to overcome line pressure at the injection point.

The Lost Cabin station is designed to handle high viscosity oil at the rate of 22,830 barrels per day under pressure of 1,000 psi. Three 55,000-barrel tanks have been constructed at this station to accommodate oil from Wind River basin fields.

Glenrock's injection station is only 27 miles downstream from the Casper station, and 26 miles upstream from a definite increase in elevation. Consequently, two high pressure 4-inch, six stage centrifugal pumps were paralleled to obtain a capacity of 31,880 barrels per day under pressure of 1,000 psi. Pumps are powered by 400 hp explosion proof motors.

The Glenrock station has no Platte owned tanks, and suction lines are connected to Continental Oil Co. tanks.

Complex possibilities of operating requirements at Guernsey and Gurley required that stations be designed with considerable versatility. The piping layout is such that both stations can operate one pump, or both pumps in either parallel or series. Operating two 4-inch centrifugal pumps in parallel at Guernsey will produce a flow of 75,420 barrels per day under pressure of 490 psi, or 37,710 barrels per day under pressure of 980 psi when operated in series. Two 55,000-barrel tanks are provided at this station, with provision for both suction from and delivery to the Rocky Mountain Pipe Line Company tanks and those of the Utah Oil Refining Company.

The Gurley station is equipped with two 6-inch centrifugal pumps which will move 99,500 barrels per day operating in parallel at a pressure of 250 psi, and 49,750 barrels per day under pressure of 500 psi. Storage available consists of four 55,000-barrel tanks. Provision is made for receipt of oil from the Ohio Oil Company and from the Sterling Pipe Line system.

The terminus of the line at Wood River, Illinois, provides for delivery north and east to Ohio Oil pump stations and to the Sinclair refinery. There is also a connection to Magnolia Pipe Line Company facilities at this terminal.

In addition to the stations mentioned, scraper trap installations were built at Yoder, Wyoming; Holdredge, Nebraska; Gower and Montgomery City, Missouri. These were built and laid out to permit conversion to main line pumping stations when additional pumping capacity is needed.

Western district headquarters, warehouse and garage buildings were constructed on the site of the Casper station. Beatrice, Nebraska is the location of the eastern division headquarters.

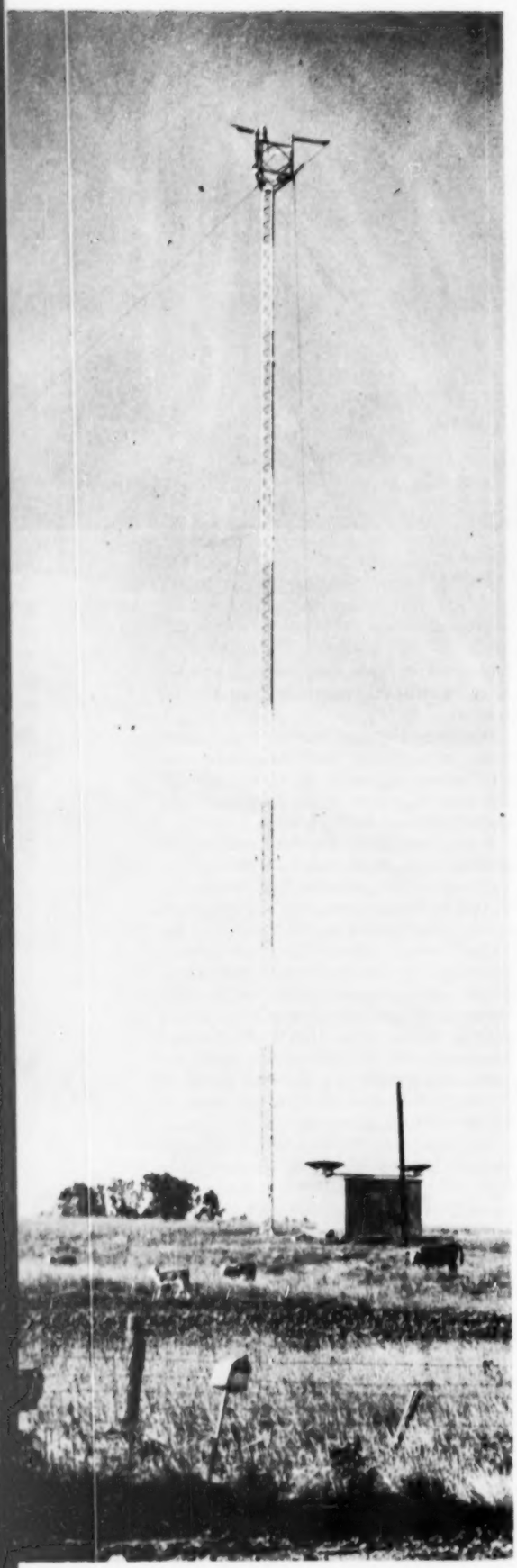
A separate pump building and control building were constructed at each pumping station. Outstanding feature of the control building is the flow control panel, which covers nearly an entire wall of the control room. This board provides a lighted picture of the valves and piping of the entire station, with lights indicating open and closed positions of all valves. Gauges indicate pressures throughout the station system, and electronic tank gauges provide an instantaneous reading of the stock in any tank at the particular station.

The panel also provides for push-button control of pump motors and motor operated valves. All instruments are either air or electrically operated with no crude oil in any way piped into the control building.

A large part of each station manifold is constructed above ground, with concrete piers for support. More economical maintenance indicated this type of installation.

The main block valves at each station are capable of remote operation from the dispatcher's office in the Kansas City headquarters of the system.

The trend toward use of electricity for power source in pipeline operations was recognized and employed to the fullest in the construction of the Platte line, as may be noted from the remarks on power units at pumping stations above.



Station manifold under construction at the Marysville, Kansas, station.

With experience records indicating that the Platte installation might expect constant service except in extremely bad weather conditions, no provision was made for standby equipment in event of power failure.

Platte stations are served with 34.5 or 69 KV by utilities company facilities, with the pipeline providing a unit type substation including a high voltage terminal structure, an air break switch, three phase transformer, and cubicle type switchgear.

Electric valve controls were installed on all large size valves throughout the system. The Casper station has 40 such operators, with other stations making use of fewer of these electrical units, due to less complex station installations.

The operation is centralized at the main control panel, with all essential elements for the operation of each station provided on the board with the exception of controls for small manifold valves, which are manually operated.

Basic design and specifications features of the line were dictated by long range considerations and the special problems to be met due to terrain, type of crudes to be handled, and the achievement of the goal of construction of a completely modern pipe line system.

The 16-inch section from Chatham to Casper is designed for 1,200 psi operation, and consists of 47.22 pound electric weld pipe, supplied by Kaiser, and mill tested to a minimum yield strength of 1,600 psi. Twenty-inch section of the line is designed for operation at 1,000 psi. Scraper trap installations in the line are designed with the same manifold layout as present stations, so that future stations may be added without shut-down of the line. The line is laid out hydraulically for eight pumping stations.

The 20-inch line pipe on the discharge side of each present and future station is 72.16 pounds, with a minimum yield of 1,560 psi. Remaining portion of the 20-inch line is 65.71 pounds, with a minimum yield of 1,420 psi.

All tanks used are pontoon type or pan type floating roof, with four six-inch nozzles with 90 degree spacing and a 60 degree angle with the shell being provided for connection to fill lines, designed to minimize accumulation of sediment. Both hand gauging tubes and electronic gauging devices are provided.

A special type of bottom outlet is provided to allow maximum use of tank volume with minimum contamination, so that the plan of pumping and keeping separate three types of crude may be facilitated.

Construction problems met were peculiar to the states traversed. Wind and irrigation ditches were common through Wyoming and much of Nebraska. The gumbo of northeastern Kansas created miring headaches for spreads on this section. Missouri problems were diverse and sometimes devilish, with extreme cold, extreme heat, water-filled line ditch, and rock so contrary as to defy ordinary blasting.

Two major river crossings were accom-

A typical microwave communications system tower is this one at Gower, Missouri.

plished with the line. Separate contracts were let for the crossing of both the Missouri, a few miles south of St. Joseph, and the Mississippi, a few miles north of St. Louis. The Missouri crossing is about 1,200 feet wide, that of the Mississippi about 2,000 feet. A stand-by line of 12 inch diameter was laid upstream from the Mississippi crossing. Regular covering, plus a flood coat of coal tar, and 2½ inches of concrete on steel mesh was used on both crossings.

Water testing of the entire line revealed only two small leaks, both of which were in mill seams of pipe.

The communications system used on the Platte line is functionally the most complex yet designed in the industry. It is a complete microwave system, from Casper to Wood River, representing an investment of more than one million dollars of the total cost of the line. It was designed and installed by the Philco Corp.

The system operates in the 7,000 megacycle range, and uses a total of 41 microwave stations, spaced at intervals of 11 to 30 miles apart. A total of 17 VHF transmitters for communication with mobile units are spaced along the line, permitting constant two way communication between air, mobile ground, and fixed ground stations.

Towers used by the microwave system range in height from 60 to 280 feet, with the taller units on the eastern section of the line. Every possible advantage was taken of terrain elevation in the more rugged western portion of the line. Many of these units are subjected to high winds and they are designed for minimum twist and sway to avoid interference with the beamed transmission by reason of varying reflector alignment.

The Platte microwave system will provide for voice communication, supervisory control of operations, continuous telemetering of pressure, gravity and flow, and teletype facilities, plus fault alarm facilities which will indicate failure or impending failure of station facilities by blinking lights and buzzers.

Complete primary and standby equipment is provided at every station. Standby power provision is also provided, and a fading margin of 30 db is provided. This fading margin provides the utmost reliability of signal transmission, and will allow a signal attenuation of 1000 to 1 before communications are interrupted, an almost unforeseen occurrence even with the wide variance of weather and atmospheric conditions common to the areas traversed by the line.

As has been mentioned, the impact of the announcement of the construction of the Platte Pipe Line was immediate and pronounced on the activity within the Rocky Mountain region. During 1951 seismic activity in the area affected jumped 62 percent over 1949, and 52 percent over 1950. Drilling in the area increased in 1951 by 18 percent over 1949, and by 60 percent over 1950. A considerable amount of all these increases is attributed to the line.

Drilling in 1952 will break all previous records. The number of completed wells will be in excess of 2,200, with the previous record of 1,770 being set in 1951.

Total of rotary rigs operating in the Rockies rose to 264 during 1952, with the average for the first 11 months at 211 units. This compares with a previous annual average activity record of 154 rotaries reached in 1948.

The influx of the proceeds of a daily movement of 100,000 barrels of crude will add materially to the available economic foundation of the industry within the Rockies. Continued re-investment of this production will go far toward fulfilling the production potential of the Rockies by providing the incentive and the capital necessary to the development of the region.

Of most immediate consequence is the reduction of tariff from 47 to 38 cents per barrel on shipments from Wyoming to Wood River. That after all, was a basic objective of the "Pipe Line of Tomorrow," which is, to the gratification of the Rocky Mountain producers, in operation today.

General view of pump and control building at the Guernsey, Nebraska, injection station.

View of the main control panel for the line.

Grader tank crew laying out tank bottom at Guernsey, Wyoming.

MAJOR ROCKY MOUNTAIN FIELDS FOR WHICH PLATTE PIPE LINE WILL FURNISH OUTLET

I. Big Horn Basin
   1. Elk Basin
   2. Silver Tip
   3. Byron
   4. Enos Creek
   5. Garland
   6. Gebo
   7. Grass Creek
   8. Hidden Dome
   9. Oregon Basin
   10. Worland

II. Wind River Basin
   1. Circle Ridge
   2. Maverick Springs
   3. Pilot Butte
   4. Poison Spider West
   5. Steamboat Butte

III. Powder River Basin
   1. Lance Creek
   2. Sussex
   3. Salt Creek
   4. Glenrock
   5. Meadow Creek

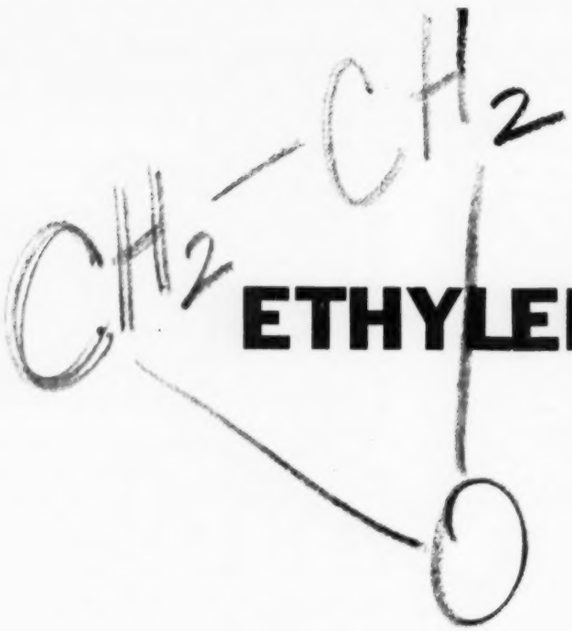
IV. Laramie Basin

V. Great Divide Basin
   1. Lost Soldier
   2. Wertz

VI. Denver-Julesburg Basin

VII. Western Nebraska

VIII. Southeastern Nebraska



ETHYLENE OXIDE

Fluid catalytic method applied to direct oxidation of ethylene in Atlantic-Vulcan process.

SUCCESSFUL APPLICATION of the fluidized solids technique to catalytic oxidation of ethylene has been accomplished through the cooperative endeavor of the Atlantic Refining Co. and Vulcan Engineering Division of The Vulcan Copper and Supply Co., Cincinnati. The novel process has been operated at Vulcan research laboratories for the past year in a pilot plant producing 100 pounds per day of ethylene oxide. It now is being offered to the petrochemical industry for commercial application.

Development of the Atlantic-Vulcan process gives the rapidly expanding division of the industry based on ethylene a choice between three processes. Oldest and most widely used at this time is the chlorhydrin process which had its inception some 90 years ago. First application of catalytic oxidation was undertaken by Carbide and Carbon Chemicals Corporation about 1925, and until recently Carbide was the only company attempting this process.

The critical shortage and high price of chlorine has been a driving force in the recent expansion of direct oxidation methods of producing ethylene oxide. The old two-step chlorhydrin process requires about two pounds of chlorine to produce a pound of finished ethylene oxide. While chlorine has become scarce, there have been engineering developments tending to reduce the high capital cost of direct oxidation facilities with the result that two are now building in Europe and three in the United States at plants not owned by Carbide and Carbon Chemicals. Carbide also is expanding.

Atlantic Refining Co. began work on the problem of direct oxidation of ethylene some years ago. The research was laid aside, however, because of the pressure of other matters of more immediate importance to the company's primary business. Later the record of Atlantic's research was transferred to Vulcan and the work continued on an intensive all-out basis. Vulcan was selected because of its long experience in chemical process engineering.

In Vulcan research laboratories, attention was centered on the perfection of plant design elements which would control temperatures with great accuracy. This was deemed essential to minimize the secondary reaction which reduces yield if permitted to occur substantially. The fluid principle gave the researchers a good start as compared with fixed beds which tended to go out of control during the highly exothermic secondary reaction. Loss of control may destroy or degrade catalyst and reduce yield.

A second problem, which was of course intrinsic in a fluid process, was the prevention of catalyst loss. In all direct oxidation methods, the catalyst is silver bearing and hence too costly to permit measurable loss in commercial operation.

For accuracy of control the Atlantic-Vulcan researchers adopted a tubular-type reactor to replace the large chamber in the fluid cracking process employed by oil refiners. A characteristic of the fluidized bed is that the catalyst is in the form of very small particles which are in constant agitation. This creates a uniform temperature throughout the catalyst bed. In the Atlantic-Vulcan process, the fluid beds are maintained in tubes which may be as large as four inches in diameter, and are surrounded by dowtherm as a transfer medium to carry off the heat of reaction.

Another unique feature of the Atlantic-Vulcan reactor is the elimination of backmixing to further minimize the secondary reaction and limit the degradation of ethylene oxide to carbon dioxide and water.

Catalyst content in each tube and the stability of process conditions are maintained by keeping a level of catalyst above the reactor tubes and by the use of specially designed orifices to maintain uniform pressure drop over the reactor tubes. By maintaining proper catalyst distribution, the pressure drop is uniformly maintained at less than five percent.

Prevention of loss of catalyst is aided by the level of catalyst above the tubes and by the installation of a porous medium in the chamber above the bed so that no catalyst passes out with effluent gas. The catalyst maintains its activity indefinitely and requires no regeneration.

Although some attention has been given by petrochemical researchers to the use of oxygen, most direct oxidation work has been based on air. Inert gases in the air have tended to aid in temperature control and oxygen requirements have not been deemed great enough to warrant the expense of an oxygen recovery plant. Principal benefit in using oxygen would be to reduce reactor size and investment. The Atlantic-Vulcan process uses air.

To avoid formation of an explosive mixture, the ratio of air to ethylene is kept at a high level in the direct oxidation process. Normal limits are 97-95 percent air and 3-5 percent ethylene. Contrasting with the two-step chlorhydrin process, the direct oxidation method is a single step reaction in which one atom of oxygen combines with two molecules of ethylene to form a single molecule of ethylene oxide in an equation which may be expressed thus: $CH_2 + \frac{1}{2} O_2 \rightarrow CH_2\text{—}CH_2$ (O)

An accompanying flow diagram illustrates the main features of the process as employed in the pilot plant at Vulcan laboratories. As indicated, air and ethylene are mixed with a stream of recycle

gas and fed into the primary reactors. The reactors consist of a series of parallel tubes, each containing fluidized catalyst. The exothermic heat of reaction is absorbed by boiling dowtherm which in turn generates the steam used in the recovery section of the plant.

The gas passes from the reactor to an absorber where the ethylene oxide is removed. After the absorber, the gas is split into two streams. One stream is mixed with fresh ethylene and air and is recycled to the primary reactor. The other stream is fed to a secondary reactor where the remaining ethylene is converted in a once-through operation. The effluent from the secondary reactor is passed through a final absorber and is then vented.

The ethylene oxide is recovered from the absorbate by direct steam stripping and the absorbate is cooled and recirculated to the absorbers. The ethylene oxide from the stripper is sent to a rectifying column for final water removal and purification and is then pumped to storage.

When an Atlantic-Vulcan unit first is brought on stream the reactor is empty. Catalyst is introduced gradually into the top chamber until the unit is balanced, after which it operates indefinitely without regeneration.

Vulcan has not revealed the type of carrier for the silver catalyst it employs. It is understood that various carriers have been used by researchers in the field and in fixed bed commercial use, but the principal ones have been in the alumina class.

Yield in pilot plant operation at Vulcan laboratories is said to be about 60 percent. This is an improvement over the 50 percent generally stated to have been obtained in earlier fixed bed practice. Product purity is 95 percent or better.

As mentioned above, control of heat evolved has a significant effect on yield. Partial oxidation of one grammole of ethylene to oxide liberates 56 kcal while complete combustion to carbon dioxide and water evolves 631 kcal. With adequate heat control such as the fluid technique permits, the very large heat formation involved in the undesired secondary reaction is minimized and yield of useful product improved. Optimum temperature for maximum conversion to oxide is about 430°F. Elevated pressures are not employed.

To avoid catalyst deterioration, it is desirable that ethylene charged to the reactor be free of sulfur. Limitation of propylene and saturated hydrocarbon content also is necessary to prevent formation of oxides other than those desired. Most important is the removal of significant percentages of acetylene formed in the cracking process as a safety precaution. Refiners producing an ethylene stream are well equipped to purify the product. Sulfur removal is not difficult and low temperature distillation is adequate to separate ethylene from higher boiling point fractions. Traces of acetylene usually are removed by hydrogenation or solvent extraction.

In the older fixed bed catalytic oxidation process, the reaction time was restricted carefully to a maximum of three to four seconds although a longer period improves yield when the secondary reaction can be controlled. Anticatalysts have been proposed to suppress complete combustion, but investigators found that there is a tendency to poison the silver catalyst and hence to defeat the original purpose. The greater heat control provided by the fluid process permits optimum residence time of ethylene in the conversion zone.

Investment cost within battery limits of a fluid type ethylene oxide unit is estimated at $4,250,000 for a plant capacity rated at 40 million pounds per year of finished product.

Based on ethylene at a cost of 4.5 cents per pound, it is estimated that finished oxide will cost about eight cents per pound to produce. This compares with a current market value of 18 cents per pound. As more producers enter the field, it is possible that the ethylene oxide market may drop back to the 15-cent level which prevailed in 1947. Meanwhile, the value of ethylene is quite likely to advance to around five cents per pound as the market expands.

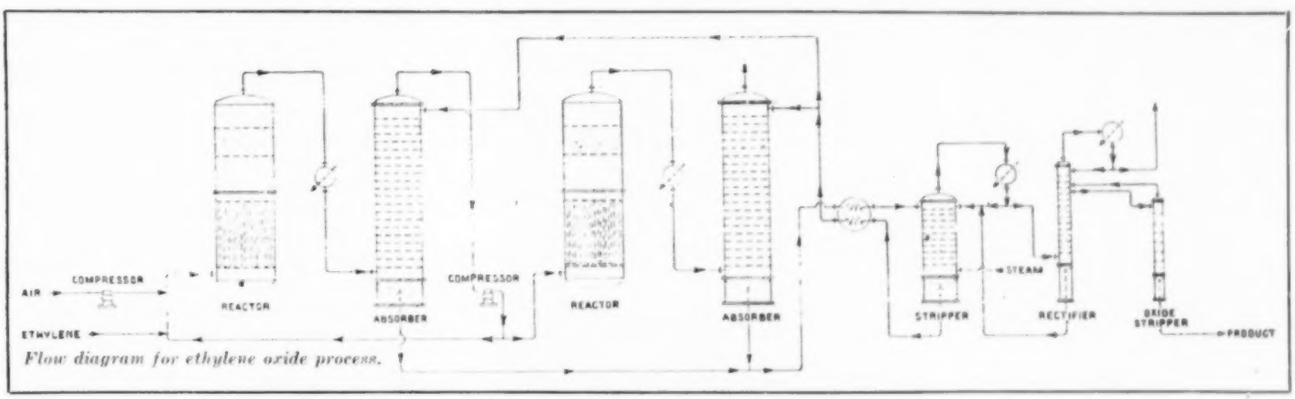
In recent years the demand for ethylene oxide has grown with amazing rapidity. In 1945 total oxide production in the United States was only 150 million pounds. By 1948 this was more than doubled, rising to 310 million pounds. Since 1948 demand has more than doubled again. Estimated production for 1952 is tentatively placed at 700 million pounds. By 1955 it is thought that demand may approach one billion pounds per year.

The production of ethylene glycol requires the largest proportion of available oxide, roughly 70 percent of the total. The remaining 30 percent is used for a multiplicity of purposes including detergents, solvents, fumigants, plasticizers, emulsifiers, lubricants, synthetic nitrile rubber, paper coatings, textile treaters, weed killers, adhesives, and synthetic fibers. The producers of fibers such as dynel, orlon and others are expected to require a very large tonnage of ethylene oxide in the future because of the public response to the new fabrics.

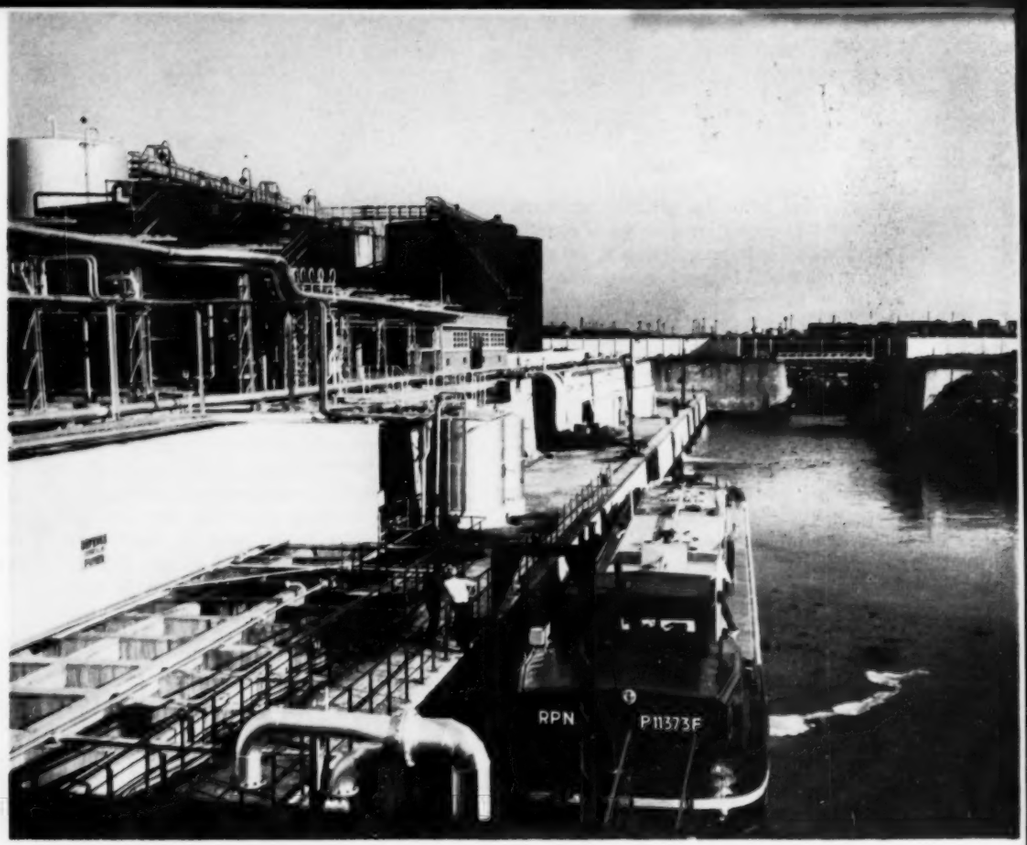
Automotive and industrial antifreeze and coolant still is the largest end use of ethylene glycol although industrial explosives, cellophane, fibers,, and softeners are becoming more important. Automotive use is about 75 percent of total available ethylene glycol, but this percentage probably will tend to fall somewhat.

Until a few years ago, the production of ethylene oxide and other chemicals and intermediates based on ethylene was almost entirely in the hands of specialized chemical companies. In a number of instances these companies built plants adjacent to oil refineries to obtain raw hydrocarbons conveniently and cheaply. More recently refiners have been teaming up with the chemical firms to form petrochemical producing corporations. Other refiners have entered the industry entirely on their own, selling intermediates to the chemical trade or marketing such products as antifreeze direct to the motorist.

With companies such as Atlantic Refining Co. devoting attention to research into conversion and recovery processes, it may be anticipated that specialized oil refinery methods such as the fluidized solids technique will be adapted to aid in meeting the expanding market for fibers, plastics, and chemicals based on petroleum hydrocarbons.



Flow diagram for ethylene oxide process.



There are two barge loading docks at the refinery which permit dispatch of products through the waterway system of northern France.

DUNKIRK ON STREAM

Complete new refinery in north of France replaces two plants destroyed in World War II.

By J. Andrault

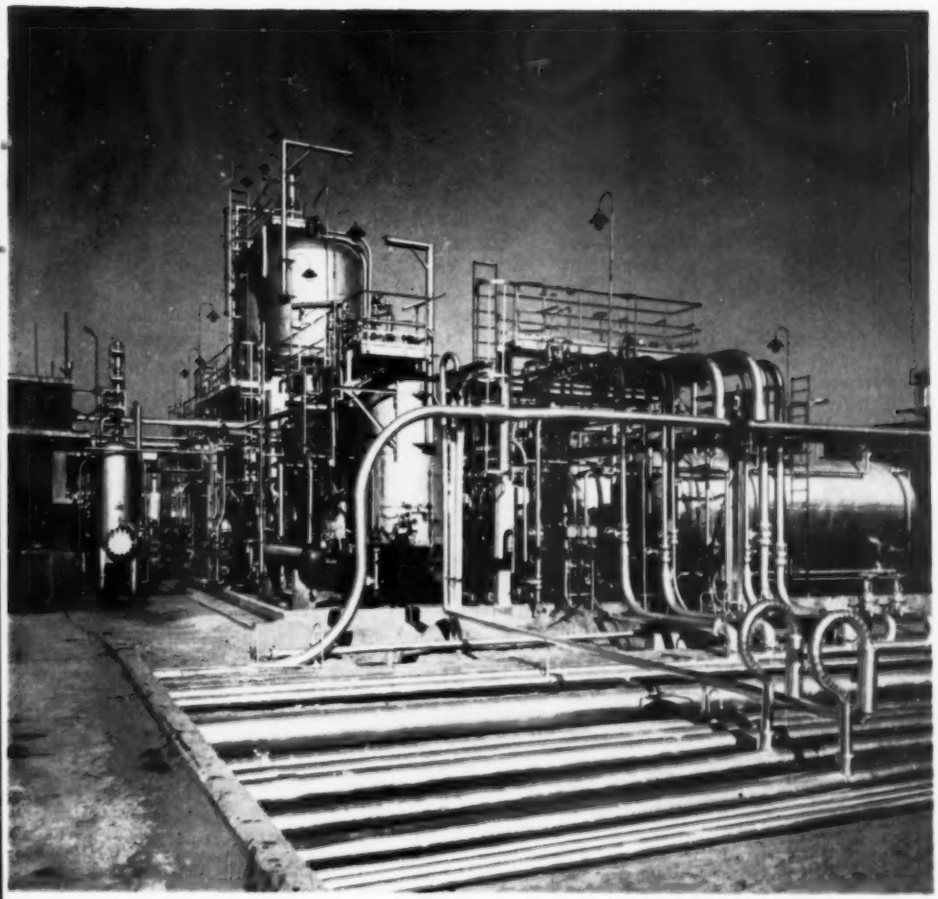
The author began in the petroleum industry in 1926 at the Societe Generale des Huiles de Petrole (Anglo-Iranian's French associate) Courchelettes refinery (North) as an Engineer attached to the maintenance service. In 1931 he was engaged by Societe Raffinerie Petrole du Nord, which sent him to Dunkirk, where he supervised the erection of the first refinery. He was promoted to chief engineer of the manufacturing department in 1937. After the war, when it was decided to rebuild the Dunkirk plant, he returned to SGHP, and, as chief engineer, was entrusted with the reconstruction job.

THE FIRST OF THE major new units having been commissioned in October, 1951, the £17,000,000 Dunkirk refinery, which is owned by the Societe Generale des Huiles de Petrole BP, the Anglo-Iranian Oil Company's French associate, is now operating at an actual yearly throughput of 2,000,000 tons (46,000 bpsd.) This represents an increase of 600,000 tons over its original design capacity.

The official opening of the refinery was carried out on October 9, 1952, by M. Louvel, the French Minister of Industry and Commerce, when he visited Dunkirk with government, SGHP-BP and Anglo-Iranian officials.

The new refinery at Dunkirk replaces two refineries which operated in the north of France before the war. These plants were the Courchelettes refinery of SGHP-BP and the old Dunkirk refinery which belonged to the Raffineries des Petroles du Nord, an associate of the Belgium Petrofina company.

Both refineries suffered damage during the war and those plant facilities which remained intact were removed to other sites. As regards the Dunkirk site, little



Gasoline treating plant at Dunkirk.

was left at the end of the war but a few damaged buildings. There was, however, certain plant still fit for further use left at Courchelettes.

In 1947 the two companies agreed that a single large refinery should be reconstructed at Dunkirk by SGHP - BP. This work has now been completed and the installations can produce all the main petroleum products from liquefied gases to asphalts, including lubricating oils and waxes.

Owing to a shortage of steel and the urgent need for petroleum products in the industrial regions of northern France, it was decided, as the first step, to construct a simple, small refinery from available materials. This first stage comprised three parts:

(1) The renovation and re-erection at Dunkirk of the Courchelettes distillation unit which had not been destroyed.

(2) The construction of storage capacity for 85,000 tons of oil.

(3) The construction of the necessary plant for ancillary services including steam, electricity, cooling water and compressed air.

Work on this stage started in October, 1948 and the Courchelettes distillation unit with a final proved capacity of 10,000 bpsd was commissioned in February, 1950.

The second stage of the refinery construction for a design total capacity of 1.4 mta (36,000 bpsd) was then commenced, and the commissioning of the new units began in October, 1951, and was completed seven months later in May, 1952. Since then the refinery throughput has been stepped up to 46,000 bpsd, since the new Lummus distillation plant has proved itself capable of processing 36,000 bpsd as compared with the design's 26,000 bpsd.

The new refinery covers 250 acres, about three times the area of the old plant. A large portion of the new site consisted of marshes. This land was filled in and raised over 11 feet by pumping in over 1.5 million cubic yards of sand obtained from the dredging of Dunkirk harbor. The built-up ground can carry medium loads, such as tanks, but heavy loads are supported on piles.

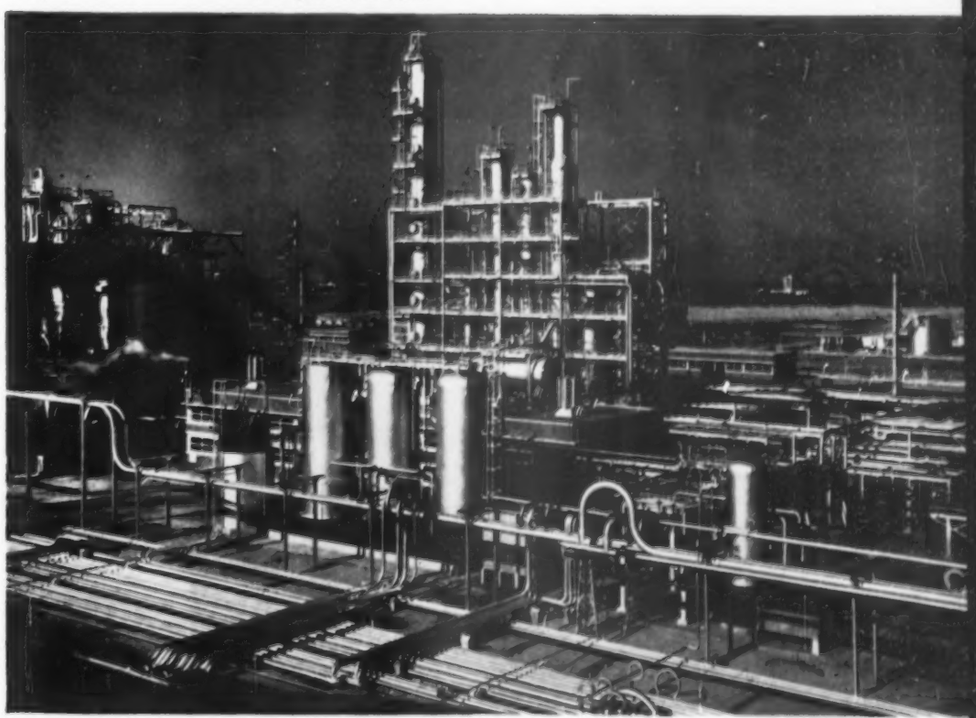
The crude oil worked at this refinery is normally from Kuwait and the inspection data of this crude is shown in Table I.

TABLE I

ANALYSIS OF KUWAIT CRUDE

Density at 15° C	0.867
Distillation ° C	
I.B.P.	38° C
% vol. at 150° C	18.50
% 150—300° C	26.00
% above 300° C	54.50
loss	1.00
Propane % wt.	0.45
Butane % wt.	1.50

Furfural extraction and contact filtration units.



The following gives a brief description of the major units in the refinery:

Distillation: The original atmospheric distillation unit of Kellogg design, with the capacity noted above, is a normal two-stage unit with a self-contained stabilizer. The primary and atmospheric towers take off four distillate streams to specification residue.

The new combination atmospheric and vacuum unit was built by The Lummus Company, the atmospheric side having a design capacity of 26,000 bpsd with a primary and atmospheric tower. An unusual feature in the design of this unit is that two side streams as well as an overhead are taken from the primary flash tower. Altogether, five sidestreams and one overhead are taken from both towers as shown in Table II which also gives the inspection data on the products obtained.

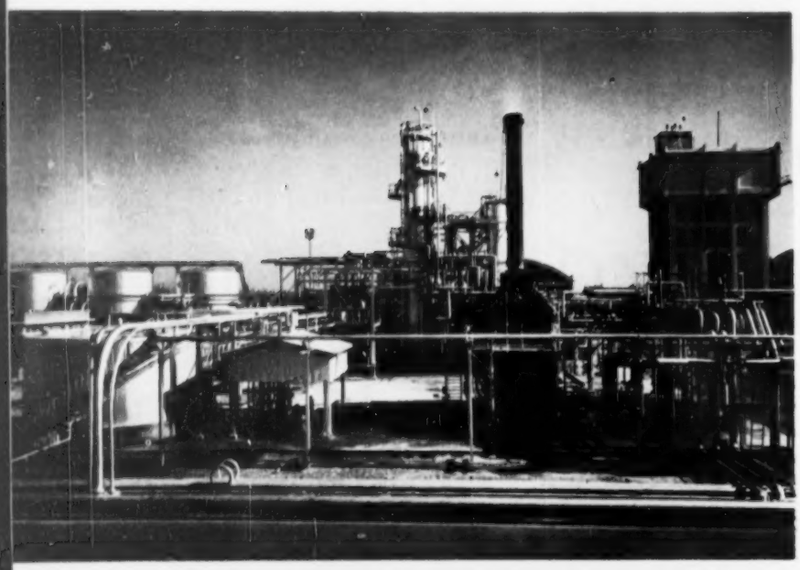
The capacity of the vacuum side is 9,000 bpsd, taking the residue from the atmospheric tower and giving four lubricating oil fractions. At the same time the unit makes a residue suitable for processing in the propane de-asphalting plant for specification bright stocks or cylinder oils. Table III shows the results obtained from the vacuum distillation unit.

Thermal Reforming Unit: This unit was designed and erected by the M. W. Kellogg Company and has a design capacity of 6,800 bpsd of once-through operation reforming light naphtha, or 5,400 bpsd on recycle operation when processing heavy naphtha. This unit possesses a full gas recovery section for the production of liquid butane and liquid propane. Integral with the unit are clay towers for the vapor phase treatment of the reformate. Yields and inspection data from this unit are shown below in Table IV.

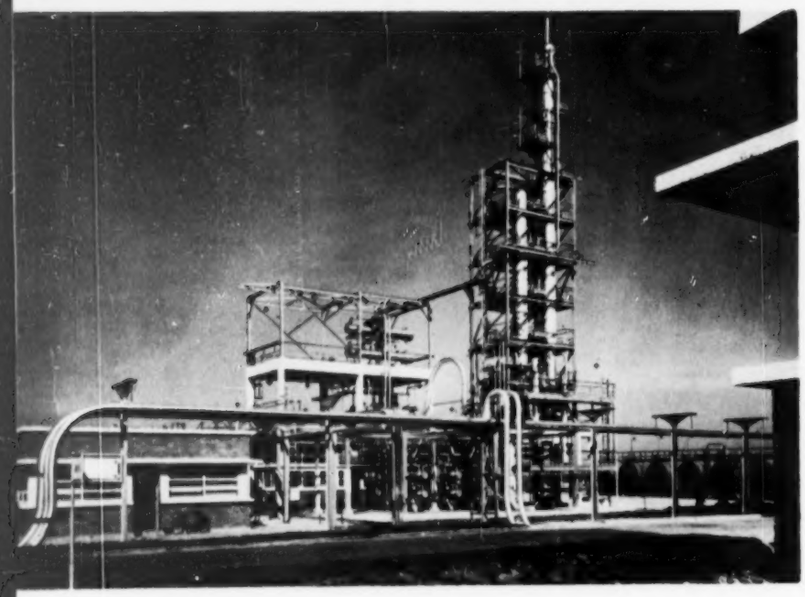
Refining Treatment: Straight-run and reformed gasoline streams are soda washed before passing to two slurry-type copper chloride units each with a rated capacity of 6,000 bpsd. Butane and propane are treated by two-stage soda units to Doctor negative. Kerosines, white spirit and special boiling point products are acid treated and soda washed.

Special Boiling Point Products: There is a small re-run unit with a 50-plate column, capacity 400 bpsd, for the manufacture of special boiling point products. Narrow cuts, boiling range of less than 20° C, may be produced from this unit.

Bitumens: Bitumens are produced by blending the propane precipitated asphalt from the unit described below with the vacuum tower residue. There are also blending facilities for the production of



Propane de-asphalting unit.



White spirit and light solvent rerun unit.

TABLE II

ATMOSPHERIC DISTILLATION

	Gas	Gaso-line	Light naphtha	Heavy naphtha	Kero-sine	Light gas-oil	Heavy gas-oil	Resi-due
Yield % weight	1	6	7	6	7	10	4.5	58
Density at 15° C		0.661	0.723	0.764	0.786	0.825	0.857	0.959
Distillation ° C								
I.B.P.		39	98	143	190	213	231	230
5%		44	103	150	198	258		
95%		100	130	190	237	298		
End Point		109	140	202	245	309		
Flash Point ° C				25	44	97	115	119
Reid Vapor Pressure Kgs.		0.900	0.200					
Octane Number MM		63	45					
Pour Point ° C						—18	0	+9
Engler Viscosity at 50° C								34

TABLE III

VACUUM DISTILLATION

Feed: Atmospheric Residue

	Heavy Gas Oil	Distillates A	B	C.1	C.2	Resi-due
Yield % wt.	12	9	10	6.5	10.5	50
Density at 15° C	.864	.898	.918	.929	.944	1.018
Flash Point ° C	140	180	210	220	250	285
Viscosity Engler at 50° C	1.5	2	3.5	6	15	
Viscosity Engler at 100° C						120
Pour Point ° C	6	21	27	29	38	

TABLE IV

THERMAL REFORMING

	Feed	Gas	Propane	Butane	Reformed Spirit	Residue
Yield % weight	100	12.5	4.5	7.5	63.5	12
Density	770				756	898
Distillation ° C						
I.B.P.	121			—13	40	165
5%	134			— 8	51	
95%	206			— 0.5	189	
End Point	216				200	
Vapor Pressure at 50° C kg/cm²			20.5	7.3		
Vapor Pressure at 38° C kg/cm²					0.340	
Octane Number (Motor Method)					69.5	
Viscosity Engler at 20° C						1.06
Flash Point ° C						65

1,100 bpsd of cut-backs and 1,300 bpsd of emulsifiable bitumens.

Lubricating Oil Units: The lubricating oil units in the refinery consist of the Texaco and JUIK solvent processes, all designed and erected by the Lummus Company. The original design was to produce 55,000 tons of solvent treated lubricants a year, but it is now clear that this capacity can be exceeded. The units comprise:

(1) A furfural refining unit, the yields and inspection data for which are given in Table VII. The average capacity of this unit is 2,400 bpsd. This, of course, varies with the grade of oil under treatment.

(2) An MEK dewaxing plant (1,560 bpsd) with four rotary filters. Recrystallization of the waxes can be carried out for the production of specification grades. Yields and inspection data are shown in Table VIII.

(3) The propane de-asphalting unit (1,100 bpsd). Yields and inspection data are shown in Table V.

(4) Clay Contact Unit, Table IX.

(5) Hot Oil Belt. In order to avoid a number of separate furnaces and at the same time the possibility of local overheating of the lubricating oils, it was decided to install a hot circulating gas oil circuit common to all the above units for solvent removal. The circulating gas oil is heated to 570°F in furnaces situated some distance from the nearest process unit.

As a further safety measure, inert gas is used in all vessels containing inflammable solvents in order to enable operations to be carried out in an oxygen-free atmosphere.

An interesting feature of this series of units lies in the fact that they are all built around a common control room. The control panels of each unit are of graphic type.

Waxing Plant: The recrystallized wax extracted from the MEK plant is treated at a suitable temperature with activated clay in a plant of 1,500 bpsd. The wax is then moulded in blocks and stacked.

The refinery is now able to produce the following from Middle East crude:

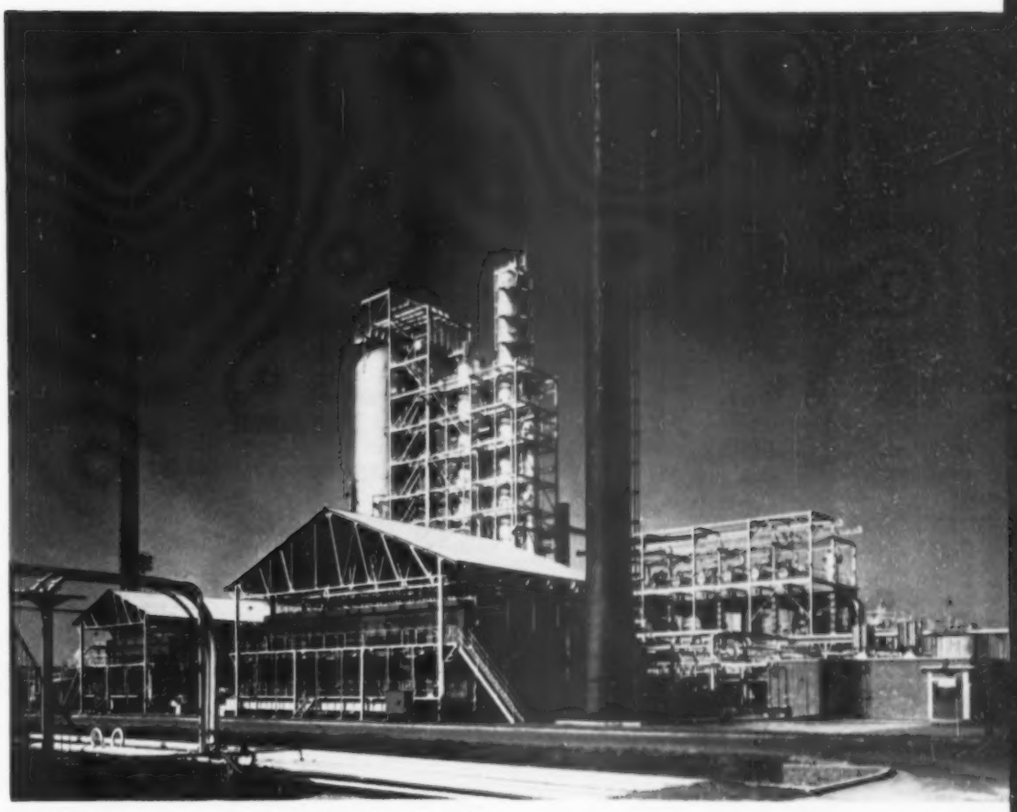
	Tons per annum
Various qualities of fuel oil	900,000
Motor Spirit	400,000
Gas Oil	300,000
Bitumens and Asphalts	100,000
Lubricating Oil	60,000
Liquid Gases	40,000
Kerosine	20,000
Solvents and White Spirits	15,000
Waxes	2,000

The general services include the production and distribution within the refinery of steam, electricity, cooling water, fresh water and compressed air. There are also instrument repair and maintenance workshops and buildings housing the fire and inspection services.

High pressure steam is produced in the boiler house and power station in two Babcock and Wilcox integral furnace boilers with a total steam capacity of 120 tons an hour at 925 psi. A boiler house, originally part of the old refinery, has been repaired and supplies 45 tons/hour of steam at 400 psi. The high pressure steam is partly expanded through the back pressure turbo-alternators to be distributed through the refinery at 210 psi and 55 psi.

Feed water for the boiler is treated in a demineralization plant by consecutive action of resins for the removal of metallic ions and acidic ions and the elimination of silica. Two turbo-alternators of 4,700 kw each and one set of 1,200 kw provide the electricity.

Cooling Water: Sea water used for cooling is led from Dunkirk harbor by a siphon five feet in diameter and 350 yards long. It is one of the largest in France.



Combination vacuum and atmospheric distillation unit.

TABLE V

PROPANE DE-ASPHALTING

Feed: Vacuum Distillation Residue

	De-asphalted Oil	Asphalt
Yield % wt	34	66
Density at 15° C	.936	1.064
Viscosity Engler at 100° C	4.7	
Softening Point R & B		58
Penetration at 25° C		15
Ratio propane to feed	8	
Treatment Column top °C	70	
Treatment Column bottom °C	40	

TABLE VI

RECTIFICATION OF LIGHT SOLVENTS

Feed : Gasoline or light naphtha

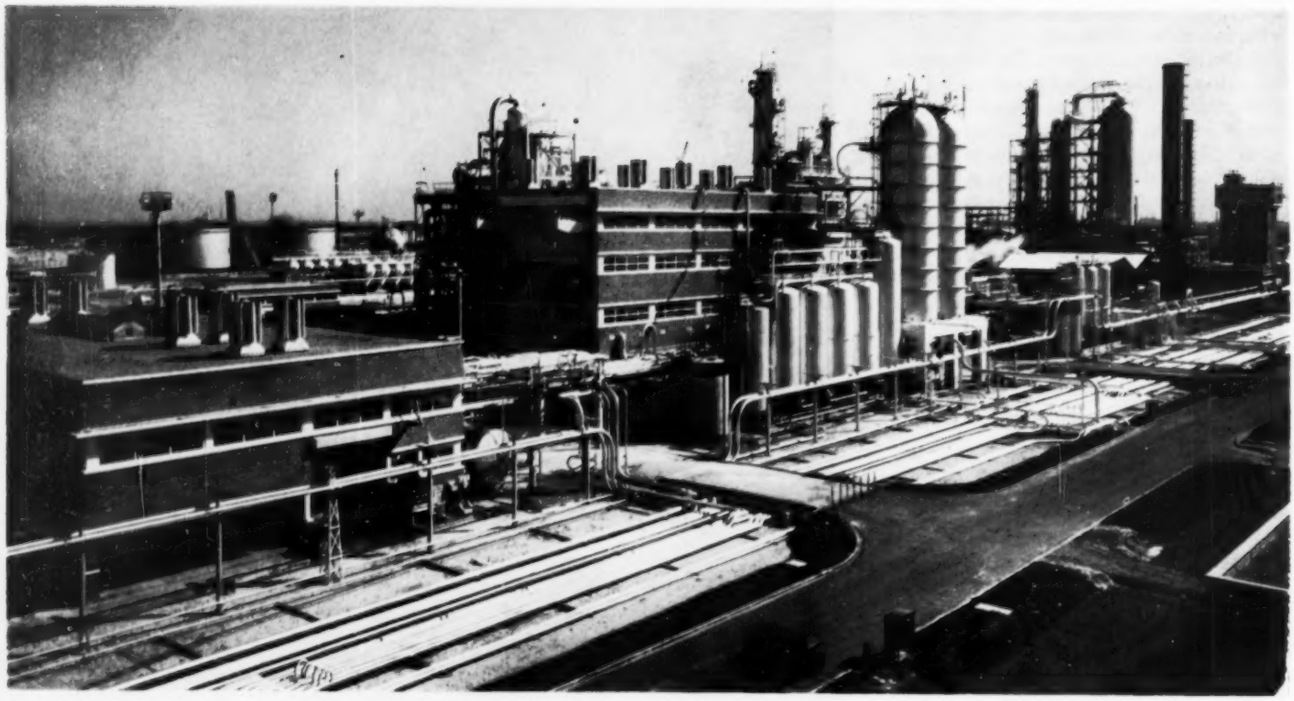
	60/80	100/130	100/160
Density at 15° C	0.676	0.724	0.732
Distillation ° C			
I.B.P.	63° C	102° C	104° C
5%	63.5	105	107
95%	68.5	122	147
E.B.P.	77	127	151

TABLE VII

FURFURAL EXTRACTION

Feed: Distillates and de-asphalted oil

	Distillates A		B		C.1		C.2		De-asphalted Oil	
	Raff.	Ext	Raff	Ext	Raff	Ext	Raff.	Ext	Raff.	Ext
Yield % weight	83	17	68	32	65	35	50	50	59	41
Density at 15° C	.870	1.02	.875	1.01	.882	1.00	.884	1.00	.900	.985
Viscosity Engler at 50° C	1.9		2.76		3.7		7.0			
Viscosity Engler at 100° C									4.1	
Ratio solvent to feed	0.7		1.6		2.0		3.5		4.5	
Treatment Column top °C	66		93		105		120		140	
Treatment Column bottom °C	43		54		60		70		95	



Left to right: MEK compressor, chiller and exchanger building; contact filtration; furfural extraction; and combination vacuum and atmospheric distillation unit. Hot oil belt system connects all of the lube processing units.

Seven vertical spindle submerged pumps can deliver 2,400,000 gallons per hour to the distribution system.

A closed fresh water system with cooling tower is being installed especially for the boiler house and power station.

Compressed Air: A central compressor house containing four large compressors provides compressed air to the refinery at 115 psi.

Fire Protection and Safety: Fire protection measures include a separate 140 psi water distribution system serving strategically placed hydrants, and there are also fire tenders for production of high pressure foam. A fire fighting team is on continuous duty.

Effluents: Spent soda and acid is neutralized and deodorized before being discharged. The cooling water is returned to source through a modified API separator.

Laboratory: The laboratory contains the most modern equipment. A separate building houses CFR motors for testing gasoline and other fuels.

Transport and Dispatch: There are two jetties in the Dunkirk refinery harbor, the large jetty with two berths being able to receive tankers of up to 28,000 tons and 34 feet draft with certain precautions. The other jetty, for coastal vessels and barges, is 650 feet long with a draft of 25 feet permitting one barge and two coastal vessels to be berthed simultaneously.

In addition there are two filling points for barges in the refinery, access to which is by means of a connecting channel to the navigable canal system of northern France.

As regards the main jetty, crude oil can be discharged at 1,200 tons/hour, and gas oil and fuel oil loaded at 1,000 tons/hour. Both jetties are equipped for the simultaneous discharge of all products including lubricating oils and asphalts.

For dispatch by rail, the refinery marshalling yard contains 10 miles of track permitting the shunting and loading of 140 rail cars a day. The railway siding is connected to the French national railway system by a private branch line.

The dispatch system is completed by road tanker filling stations for the whole range of products.

Two housing estates have been constructed near the refinery by SGHP. The group adjacent to the refinery contains houses for 23 families and a residential club. The second estate, some distance from the refinery, provides housing for 160 families. In addition a block of flats has been built in the town of Dunkirk.

TABLE VIII

MEK DE-WAXING

Feed: Raffinate

Raffinate from:	Distillates A		B		C1		C2		De-asphalted Oil	
	Filt	Wax	Filt	Wax	Filt	Wax	Filt	Wax	Filt	Wax
Yield % wt.	85	15	87	13	86	14	84	16	80	20
Density at 15° C	.877		.880		.887		.891		.903	
Viscosity Engler at 50° C	2		3.1		4.6		8.4			
Viscosity Engler at 100° C									4.66	
Pour Point ° C	—21		—18		—18		—15		—15	
Ratio solvent to raffinate	3.2		3.8		4.8		5.0		5.5	
Filtration temperature ° C	—28		—29		—29		—29		—30	

TABLE IX

CLAY CONTACTING

Feed: De-waxed Raffinates

De-waxed Raffinate from:	Distillates A	B	C.1	C.2	De-asphalted Oil
Density at 15° C	.877	.880	.887	.891	.903
Flash Point °C	180	210	220	250	270
Viscosity Engler at 50° C	2	3.1	4.6	8.4	
Viscosity Engler at 100° C					4.66
Viscosity Index	95	95	95	95	95
Pour Point °C	—21	—18	—18	—15	—15
Carbon Residue (Con.)	.01	.02	.02	.06	0.5
Color A.S.T.M.	1.5	1.5	1.5	2	4
Clay Treatment % wt.	1	1	1.5	1.5	3

Ten year plan for Mexican oil development

A STEPPED-UP CAPITAL investment in Mexican oil development is outlined in a report prepared for the International Bank for Reconstruction and Development which probably will be published within the next few months. The 375-page study, entitled "Long Range Trends In The Mexican Economy," is the product of a combined working party composed of two economists from the bank and two from Mexico.

The study, originally suggested by Nacional Financiera S.A. in 1951, was carried out by Paul Ortiz Mena of that organization and Victor L. Urquidi of Banco de Mexico as Mexican representatives and Albert Waterston and Jonas H. Haraiz representing the bank.

The authors of the report have gone extensively into the course of the Mexican oil industry since the time of expropriation in 1938 and have reached the conclusion that "substantial investments for the exploration of new oil fields are imperative to secure a continued rise in production over the next ten years." Such an increase is needed, it is pointed out, to meet the steady rise in domestic consumption of petroleum products, which is due to overtake production in 1955, and to improve the Mexican economy. Obstacles to the provision of capital adequate for this purpose by Mexico itself are detailed at length.

"The Pemex (Petroleos Mexicanos) investment program provides only a modest increase in drilling which could hardly realize the necessary production goals," says the report.

"Nor can drilling by foreign contractors be relied upon to bring Pemex much closer to its objective. For the Mexican economy as a whole, however, the petroleum problem is by no means insoluble or even especially difficult. It is, in essence, a matter of diverting investment to petroleum from less urgent sectors."

During the past 13 years, the report points out, a total of 87 percent of petroleum investment capital — 1,331 million pesos — has come from reserves and other company funds; six percent, or 82.5 million pesos, came from domestic loans; four percent, or 48.3 million pesos, came from an Export-Import Bank loan; and three percent, or 46.0 million pesos, came from American drilling contractors.

Within Mexico, Pemex faces two major handicaps in the way of financing large-scale expansion of the petroleum and gas industry, it is stated. One is that the Mexican government corporation pays many of the nation's bills in the form of taxes and subsidies such as reduced prices to the National Railways. Assuming the subsidies came to 160 million pesos during 1950, subsidies and taxes together took away 33 percent of the gross receipts due the company in that year.

While Pemex is expected to finance petroleum investment from its own resources, "it is difficult for the company under present conditions to increase refining and transportation capacity and at the same time to raise exploratory and developmental drilling to required levels.

The report points out that Pemex has invested for the shortrun gain, whatever the reason. As an example, it says, out of 567 oil and gas wells sunk between 1946 and 1950, as many as 80 percent were developmental and only 20 percent exploratory. Many of the wells were sunk in the Poza Rica field, which accounted for four-fifths of the total increase in Mexico's crude oil production during the past six years. The field's limits, however, are being reached.

"Unless expenditures for exploratory and developmental drilling rise far above their present level," it is stated, "it is unlikely, in the absence of striking new discoveries, that production will increase as much in the next as in the past five years." On the "well-founded supposition" that Pemex will hold its drilling pace to about present levels, this means an annual increase in petroleum supply of only two percent a year for the next five years. Combining natural gas and petroleum, the increase ahead will be in the neighborhood of four to five percent a year in the coming half decade.

Against this, however, demand is rising more than 10 percent a year. As a result, petroleum and natural gas (in petroleum equivalents) available for export will shrink from 13.9 million barrels in 1950, or 20 percent of production, to 0.7 million in 1955.

"The main Pemex objective in the future, as in the past, must be to provide the increase in production, refining and transportation which can meet the rapidly expanding domestic demand," says the report.

The investments in the various branches of petroleum operation are set forth in the report.

Refineries, for instance, received the largest single slice of total investment funds, or 367.1 million pesos; oil fields were next with 364.6 million pesos; oil and gas wells used up 176.3 million pesos; oil pipe lines absorbed 94.8; shipping 93.5; gas pipe lines 67.4; department of domestic sales 53.9; urban construction (real estate) 39.3; rolling stock 14.2; marine department 5.1; and miscellaneous 8.6.

A total outlay of 46 million pesos spent by American contractors in drilling oil wells during the years since the 1948-1950 period may be added to give a grand total of 1,331 million pesos. Nearly half the total was spent during 1949 and 1950, and another third during the 1945-1948 period.

The capacity of nine Mexican petroleum refineries, as of 1950, is given as follows:

	Distillation	Cracking
Poza Rica, Ver.	4,000 b/d	—
Mata Redona, Ver.	15,000	8,000
Arbol Grande, Tamps.	22,000	—
Minatitlan, Ver.	24,000	—
Atzcapotzalco, D.F.	50,000	14,500
Ciudad Madero, Tamps.	75,000	5,500
Bellavista, Ver.	—	—
Salamanca, Gto.	30,000	5,000
Reynosa, Tamps.	4,000	—
Total	225,000	33,000

In 1950, Pemex operated 1,883 tank-cars with a capacity of 426,352 barrels of petroleum, 560 tank trucks with a capacity of 25,796 barrels, and 1,031 storage plants and tanks with a capacity of 1,836,211 barrels.

It operated a total of 2,539 kilometers of oil pipe lines, with a daily capacity of 948,400 barrels, an increase from the total 1938 figure of 1,717 kilometers, handling 664,400 barrels daily.

A five-fold increase in gas pipe line capacity during the 13 years of 819 kilometers with a daily capacity of 510 million cubic feet is shown in the statistics. In 1938 the company handled 372 kilometers of pipeline with 100 million cubic feet of capacity.

A total of 811 oil wells was drilled during the period, of which 135 were exploratory and 676 for operation. Of the exploratory wells, 34 were productive and 101 non-productive. Of the development wells, 446 were productive and 235 non-productive.

Mexican petroleum production standing at 38.5 million barrels of crude petroleum for the year 1938, advanced to an estimated 75.9 million for 1951, the report said. At the same time, domestic consumption climbed from 21.7 million barrels to 64.9 million barrels in 1951. Exports, meanwhile, came to 14 million barrels in 1938 and 13.9 million barrels in 1950.

The fields producing Mexico's petroleum in 1951 are given as follows:

Field	1951 Production	
Ebano-Panuco	8,508,000 barrels	11%
Faja de Oro	7,568,000 "	11%
Istmo	7,758,000 "	10%
Poza Rica	51,372,000 "	68%
Noreste	742,000 "	1%
Total	75,948,000 "	100%

The report does not attempt to specify in detail the total amount of capital needed for the expansion of the industry, suggesting that this be made the subject of a further study, if desired.

CATFORMING FOR OCTANES

By B. E. Milner*

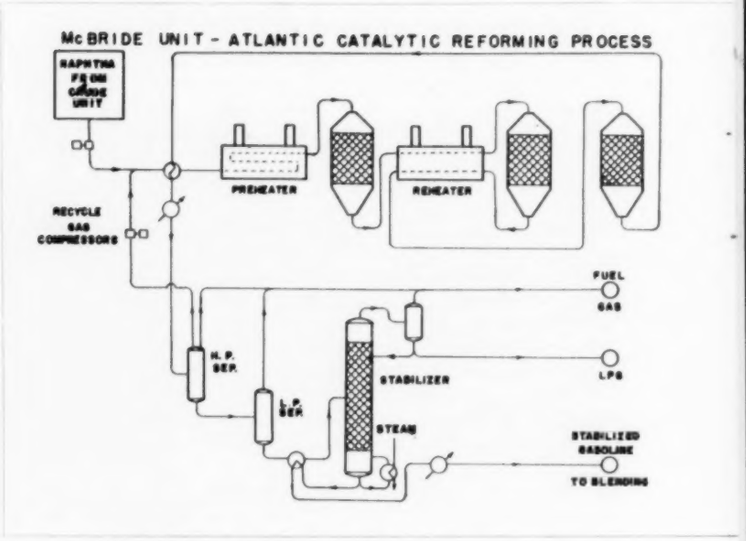


Figure 1. Flow diagram of McBride Catformer.

THE ABILITY TO REMAIN competitive in gasoline quality is an ever-present problem for all refiners and natural gasoline producers. The postwar trend of increasing octane requirements and the predictions for the future have caused all operators to review their gasoline processing methods in the light of higher octane ceilings. Careful studies on both an industry-wide and an individual refinery basis have shown catalytic reforming to be the logical solution for higher octanes at maximum yield. Of equal importance to yield and octane results is the cost of their attainment, measured both by initial investment and daily operating costs. While the octane problem is being thoroughly evaluated throughout the industry, an immediate solution is required by most of the smaller refineries where processing flexibility is more limited.

The Atlantic Refining Company's answer to gasoline quality requirements is its Catforming process. The first commercial operation of this process was initiated in early August, 1952 at the McBride Refining Company in LaBlanca, Texas. The Catforming process is the result of several years' intensive research and development work by Atlantic, in search of a process and a catalyst to produce high yields and octanes at minimum costs. The Davison Chemical Company has taken an active part in the development of the catalyst and is currently producing the catalyst in a new specialties catalyst plant.

The McBride refinery processes 2,000 b/d of crude and distillate at its refinery at LaBlanca in the Rio Grande valley of south Texas. Its problem was similar to that existing in many independent refineries. Naphthas available for gasoline marketing were from two sources, Donna Crude and LaBlanca distillate. Inspections of these full-boiling straight run naphthas are shown in Table I. It will be noted that the full-boiling range Donna naphtha has a clear research octane of 56. The LaBlanca straight run, however, is an extremely paraffinic material having a research octane of about 31 and containing about 75 percent paraffin hydrocarbons. In order to meet competitive gasoline quality, it was necessary to undercut these straight run naphthas and to purchase costly high octane blending components. With this procedure, both quantity and quality of final gasoline were limited. McBride was faced with the problem of finding the most economical way to meet today's octane demands and to prepare for the future.

Following a pilot plant evaluation of McBride feed stocks by the Catforming process, a contract for construction of an Atlantic unit was signed in early 1952. This 750 b/d Catformer was designed and constructed by the Grebe and Doremus Process Company. The unit was started up on August 4, 1952 and has been in continuous operation since that time, performing at or above design conditions. Typical process results from the McBride plant on Donna and LaBlanca straight run naphthas are shown in Table II. A 3cc F-1 octane of 94.6 is obtained on Donna at a yield of 99.2 volume percent of C_4 free feed. The low octane LaBlanca stock is being upgraded to 87.5 F-1 octane at 3cc TEL at a yield of 94.1 percent.

It is well recognized that in catalytic reforming the properties of the feed stock have a major effect on the yields and octanes produced. Referring to Table I, it will be noted that the LaBlanca feed contains only 20 percent naphthenes and five percent aromatics. In fact, both of the stocks at McBride are unusual, in that over 75 percent of the naphthenes are C_6 and C_7 hydrocarbons, which are the most difficult to convert. Tabulated below is a breakdown of the hydrocarbons in each feed stock.

LaBLANCA

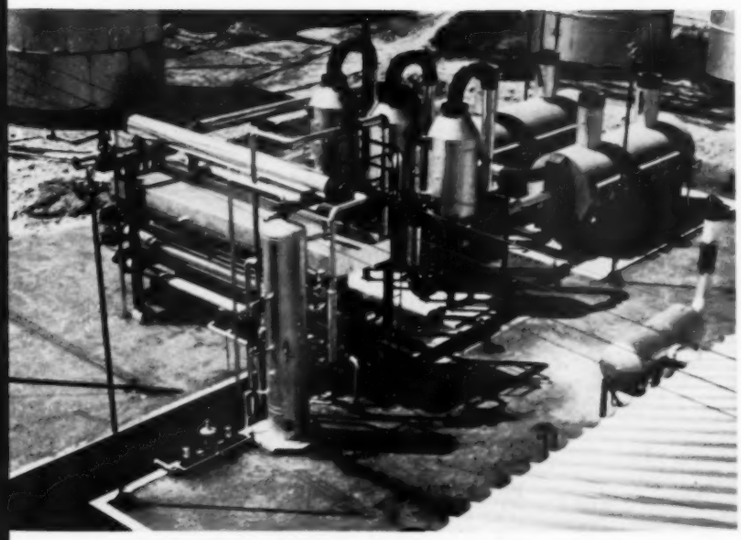
	Paraffins	Naphthenes	Aromatics
C_5—C_5	5.4	—	—
C_6	6.4	9.5	1.4
C_7	14.9	6.5	1.0
C_8	18.5	2.8	1.3
C_9	15.7	0.9	0.9
C_{10} plus	13.7	0.5	0.6
	74.6	20.2	5.2

DONNA

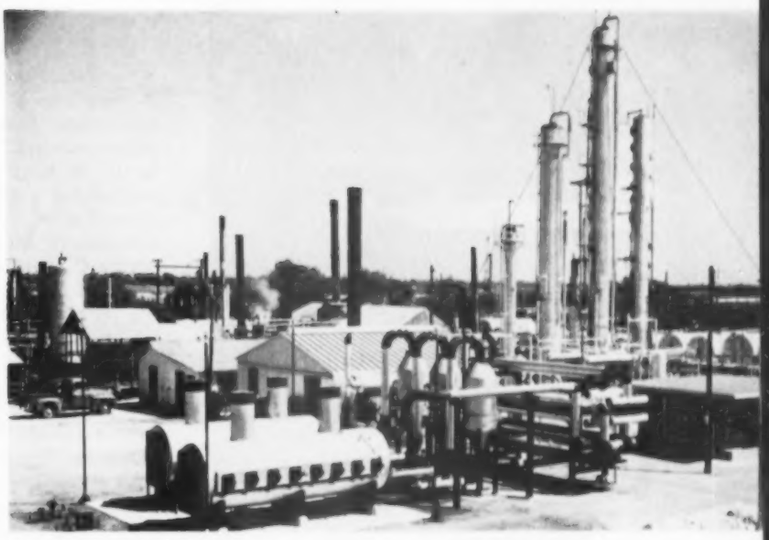
	Paraffins	Naphthenes	Aromatics
C_5—C_5	4.6	—	—
C_6	8.0	15.9	1.0
C_7	7.8	12.0	2.2
C_8	10.8	5.3	4.7
C_9	10.2	1.9	3.5
C_{10} plus	9.2	1.4	1.5
	50.6	36.5	12.9

Octane improvement is accomplished by four primary reactions: dehydrogenation of naphthenes to aromatics, isomerization of paraffins and naphthenes, hydrocracking and desulfurization. For a feed stock such as LaBlanca it is necessary to have a very selective catalyst which will provide a controlled amount of hydrocracking while maintaining dehydrogenation activity to produce hydrogen. In addition, the cracking must take place near the central carbon atom of the molecule so that little methane or ethane is produced. This assures maximum liquid recovery and a high purity of the recycle gas. The operating results, shown in Tables I and II, being obtained after several months' continuous operation at McBride, attest to the suc-

*Director, Gas & Gasoline Section, Refining Division, Research & Development Department, Atlantic Refining Co.



Exchangers, reactors and furnaces of the McBride Catformer.



Overall view of McBride refinery with Catformer in foreground.

cess of this first commercial operation of Catforming.

What equipment and operating procedures are required to obtain these results? The major aim in the development of the Catforming process was to produce a catalyst that could be utilized in a simple straightforward operation. The performance of the McBride unit has been the culmination of this development. A description of the process flow diagram will illustrate the simplicity of the equipment required (Figure 1.) Naphtha, from the crude unit or rundown tankage, is pumped directly to the reaction section of the unit. It is joined by the recycle gas stream before entering the heat exchangers where the naphtha gas mixture is heated to approximately 800°F at 500 psi pressure. The mix is then passed through the three furnaces and reactors in series. Reactor inlet temperatures are controlled to 875° to 975°F depending upon the reforming severity desired. The final reactor effluent is cooled by exchange with the feed and passes to the high pressure separator. Recycle gas and the net hydrogen production are taken overhead. Separator liquid flows on level control to a secondary flash drum before entering the stabilizer. This conventional packed column controls the vapor pressure of the reformed gasoline which then flows directly to gasoline blending. Overhead from the stabilizer is partially condensed as 100# RVP L.P.G.

The utility requirements for this plant are summarized in Table III. The total furnace duty is 2.5 million Btu/hr., with the greatest part of the heat load being accomplished by exchange. The stabilizer reboiler duty, when producing a 9# RVP reformate, is 0.5 million Btu/hr. Total power requirements are 125 bhp, of which the major consumption is the gas engine driven recycle compressor. It is significant to note that there are only two pumps on the unit, both steam driven. Actual catalyst costs cannot be reported at this time since the unit is still operating on its initial charge of 2,700 pounds of catalyst. It is anticipated, however, that catalyst cost will be appreciably below 10 cents per barrel. Only a part of one operator's time per shift is required for operation and control of the McBride Catformer.

The important features of the Catforming process which determine its yield octane results and the facilities required to produce them may be summarized as:

(1) It is a fixed bed, continuous process operated at the following conditions:

Reactor temperature	875°-975°
Reactor pressure	500 psi
Gas recycle to naphtha ratio	10 mol/mol
Weight space velocity	3.0

(2) No pretreatment or prefractionation facilities are required since the Atlantic catalyst is not affected by water or other known poisons.

(3) No product rerun or treating facilities are required. The stabilized reformate is essentially sulfur free, and has good color, odor and gum stability.

(4) The catalyst may be regenerated, in place, by air and steam when activity has declined to an undesirable level. Regeneration may also be employed to correct for an operating upset which deposits carbon on the catalyst.

(5) Catalyst properties are controlled to give high yields of propane and heavier hydrocarbons with low yields of methane and ethane. Gas made from the high pressure separator is 88-95 percent pure hydrogen.

The performance of the McBride Catformer has attracted wide interest throughout the industry as a new solution to the competitive gasoline octane problem. The start-up of at least five additional Catformers ranging in size from 750 to 12,000 b/d is anticipated within the coming year.

TABLE I

McBRIDE CATFORMER
FEED AND PRODUCT INSPECTIONS

Stock	Donna		LaBlanca	
	Feed	Reformate	Feed	Reformate
API Gravity	56.3	56.6	62.7	64.7
RVP	3.4	7.3	5.0	6.6
IBP	126	98	116	100
10	200	146	198	140
30	239	196	240	178
50	267	235	275	218
70	297	270	303	258
90	340	320	341	310
E.P.	379	392	382	378
F-1 octane—clear	56.0	79.3	30.8	64.0
% Paraffins	50.6	49.6	74.8	74.8
% Naphthenes	36.5	15.3	20.2	8.1
% Aromatics	12.9	35.1	5.2	17.1

TABLE II

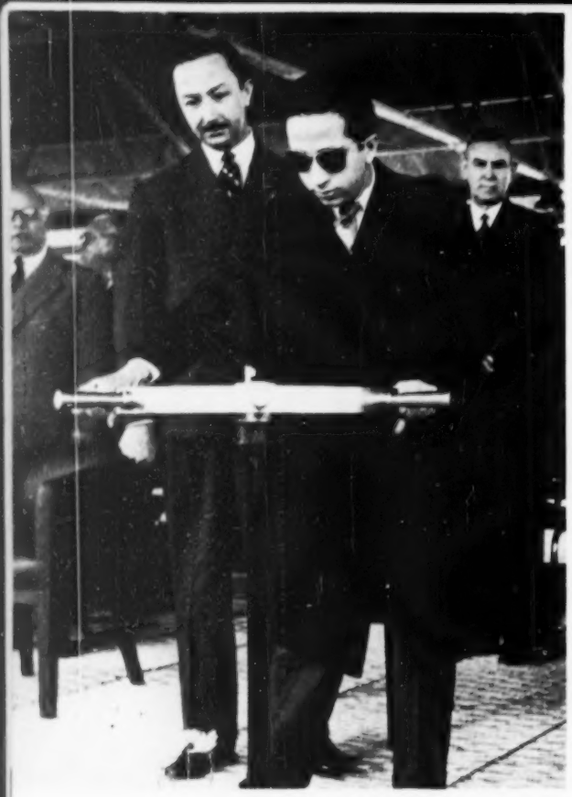
McBRIDE REFORMING RESULTS

Stock	Donna	LaBlanca
Yields—% of C_4 free feed		
10# RVP Reformate—vol. %	99.2	94.1
excess butanes—vol. %	2.5	4.0
propane—wt. %	3.1	4.2
ethane—wt. %	0.3	0.3
methane—wt. %	0.1	0.1
hydrogen—wt. %	0.6	0.2
Recycle Gas—wt. % hydrogen	93	90
Octanes—F-1		
10# RVP Reformate—clear	79.9	65.8
plus 3cc T.E.L.	94.6	87.5

TABLE III

UTILITY REQUIREMENTS
McBRIDE 750 B/D CATFORMER

Furnace Duty—heat to oil	2.5 million Btu/hr.
Stabilizer Reboiler Duty	0.5 million Btu/hr.
Compressor Power	110 bhp.
Feed and Stabilizer Reflux Pumps	15 bhp.



His Majesty King Faisal II of Iraq opening the valve on the 30-32-inch pipe line at Kirkuk.

Iraq's new pipe line formally opened

Col. Adib Shishakly, deputy prime minister of Syria, and H. S. Gibson, managing director of Iraq Petroleum Co. Ltd., at luncheon following Banias ceremony.

By E. Lawson Lomax

BEIRUT

FORMAL OPENING of the new 30-32-inch pipe line of the Iraq Petroleum Co. Ltd. from Kirkuk to Banias, on the Mediterranean, was officially performed by H. M. King Faisal II of Iraq in the presence of a distinguished gathering on November 18. The King, accompanied by the Regent, his ministers and members of the Court, traveled by air from Bagdad in a Viking of Iraqi Airways, landing on a specially-made runway close to K1, the first pumping station of the pipe line, where the opening ceremony took place.

His arrival at the platform was the signal for a tremendous outbreak of enthusiasm from the assembled people which delayed proceedings for several minutes and broke out again from time to time, and after the opening ceremony had been completed.

The King was welcomed on the platform by Sir John Cunningham, Admiral of the Fleet, G.C.B., M.V.O., and chairman of the Iraq Petroleum Co., who emphasized the great honor conveyed on all present by the King's gracious agreement to perform this opening ceremony.

The ceremony consisted of His Majesty's opening a valve on the main entrance to the 30-32-inch line, when the sound of oil in its passage through the valve could be distinctly heard and could be followed visually by the rise in pressure on the line, indicated on a large pressure gauge visible to spectators.

The enthusiasm of the crowd was widely demonstrated during a fireworks display in the early hours of the evening when all eyes were on His Majesty rather than on the display of pyrotechnics.

The opening ceremony was followed by a luncheon, where the chairman of the Iraq company, Sir John Cunningham, after thanking the King for performing the opening ceremony, pointed out the effect this opening of a new pipe line to the seaboard would have on the future economy of Iraq, affording capital for much needed general developments in the country, such as the provision of irrigation systems, first to control the flood waters of its main rivers and later to use this controlled water for irrigation to improve the general agricultural standard, the provision of hospitals and health services, the extension of road and rail facilities, and general uplifting of the fertility of the land and consequently raising the living standard of its people.

He also announced that Kirkuk would in future be supplied with domestic water from the Zab River scheme developed by the company, that the company would ask the King to appoint a committee to deal with a gift of 50,000 dinars which the company was making for charitable purposes in Iraq, and a gift of 5,000 dinars direct to the poor of Kirkuk.

The Regent, H. E. Emir Abdul Ilah, in reply thanked Sir John for his speech and the information conveyed in it and hoped the company would increase its efforts towards the welfare of its Iraq workmen.

A further opening ceremony was held at Banias, the Mediterranean terminus of the pipe line. The occasion was marred only by inclement weather, rain falling heavily the whole time.

It was performed by H. E. Brig. Gen. Fauzi Selo, chief of state and prime minister of Syria, who was accompanied by Col. Adib Shishakly, deputy prime minister, minister of state, chief of the general staff and minister of foreign affairs of Syria, together with various ministers, members of the government, military bureau, gendarmerie and police, who were received by Sir John Cunningham and H. S. Gibson, managing director of the Iraq Petroleum Co. Ltd.

In his speech at the luncheon, the chairman, in thanking His Excellency for performing the opening ceremony, stated that it marked the completion of the greatest single task yet undertaken by the company, this completion having been achieved six months ahead of scheduled time, which in these days of shortages and delays is a highly commendable feat.

To commemorate the inauguration, the company asked to be allowed to build and equip a medical clinic in Banias, and to offer it as a gift to the municipality as a contribution to the fight against sickness and disease which is being vigorously waged by the Syrian government. In addition, the company would like to make a donation of £50,000 sterling for charitable purposes.

In conclusion, he hoped that the negotiations now proceeding between the Syrian government and the company would soon be brought to a satisfactory conclusion.

General Fauzi Selo, in his reply, congratulated the company on the successful completion of the gigantic work. He stated that the government, which enjoys the fullest support of the people, welcomed international co-operation based on the rights and legitimate interests of the country, and is determined to continue its support of the project, providing Syria's share of the profits is equitably commensurate with her participation in the field of international economy.

The only part Syria has played in the operations of the Iraq Petroleum Co. has been that of allowing pipe lines to carry the oil produced in Iraq to be partly laid in Syrian territory. Since Syria was involved in no expense on the project, it is difficult to see what justification she has in seeking to share in the profits, beyond being paid a fair sum for the privilege of right of way. The company has invested a capital sum of about £43,000,000 (upward of $120,000,000) in the line.

For a full description of the building of this newest and largest of Iraq's pipe lines, see WORLD PETROLEUM, *October, 1952.*

Oregon's Governor Douglas McKay, named by President-elect Eisenhower as Secretary of the Interior in his cabinet.

WASHINGTON DATELINE

WASHINGTON LOOKS TO CHANGES IN OIL PICTURE

By Joseph Huttlinger

AS THE WORLDWIDE petroleum industry moves into a New Year, it has, perhaps, a keener interest in Washington plans and programs than at any time in past history. Petroleum executives point out that decisions ahead on major issues could have a far greater impact upon the oil industry at home and abroad than many taken at the height of World War II.

Beyond that, they expect new ideas to be introduced with the first complete turnover since 1933 in top government policy executives, numbering 2,500, as the Republicans take over the federal administration.

A dozen-odd problems of paramount importance to petroleum are before Washington for action, with one common thread linking them. All have been hanging fire for more than a year. Some, such as the Iranian oil crisis, involving the whole future of billions of dollars of petroleum investment abroad, have become more acute. The same goes for the Korean war, which still contains possibilities of starting the world on its first adventure in the horrors of atomic warfare.

Government controls over prices and wages and over the distribution of steel and other materials for the oil industry are still in effect, and promise to remain so in the months to come, despite a trend toward decontrol. The Petroleum Administration for Defense, which is no alarmist agency, is convinced that it should remain in business for a long time yet, at least, it feels, until the worst is over in shortages of aviation gasoline and steel for oil wells, and until a greater reserve of domestic producing capacity has been built up. This, PAD's J. Ed Warren feels, won't be in less than a year.

Beyond this, one new problem, the Justice Department drive on the alleged international petroleum cartel, has been added. The crackdown, which could lead to a disastrous upset to world oil supply and a remaking of the world's oil map, might be called off by the incoming administration, but no intimation regarding this has been given.

An interesting sidelight on the "cartel" action is the revelation made by the Justice Department that legal proceedings were undertaken on direct orders from the President. A White House memorandum to the State, Defense, Interior, and Commerce departments, which was included among government exhibits before the federal district court, contained this statement along with directions to those departments to "cooperate in gathering evidence required for these proceedings."

Congress will continue oil investigations, according to rumblings already heard. A score or more regulatory agencies will be peering at the petroleum industry from one angle or another. Overall, it appears that the only sure forecast in the picture lies in the tidelands area. The President-elect, unlike his predecessor, has promised to approve a state-title measure, and the only question is when the Congress will get such a bill to him.

By and large, businessmen are expected to have a greater voice in the new administration, in contrast to the past 20 years. Of the nine Cabinet members, five are business executives, a practical maximum. They include:

Secretary of Defense: Charles E. Wilson, 62, president of General Motors Corporation, the country's largest auto manufacturer.

Secretary of the Treasury: George M. Humphrey, 62, chairman of the board of the M. A. Hanna Co., which has interests in iron, steel, copper, oil, natural gas, rayon, plastics, shipping and banking.

Secretary of Commerce: Sinclair Weeks, 59, finance chairman of the Republican National Committee, and chairman of the board of United-Carr Fastener Corp. and of Reed & Barton Corp.

Postmaster General: Arthur E. Summerfield, 53, chairman of the Republican National Committee, owner of one of the largest automobile agencies in the country, and a real estate man.

Secretary of the Interior: Douglas McKay, 59, Governor of Oregon and owner of the largest automobile agency in his state.

Other members of the new Cabinet will be:

Attorney General: Herbert Brownell, Jr., 48, a lawyer and one of the men who helped put President-elect Eisenhower in the White House.

Secretary of State: John Foster Dulles, 64, one of the nation's highest paid lawyers, who is with the firm of Sullivan & Cromwell, New York. For the past four years, he has held top diplomatic posts.

Secretary of Agriculture: Ezra Taft Beson, 53, a Utah farmer and a farm leader.

Secretary of Labor: Martin P. Durkin, 58, president of the Plumbers and Pipe Fitters Union, American Federation of Labor.

Under Mr. McKay as Secretary of the Interior, the oil and gas industry looks for more sympathetic consideration than it has had at times in the past, chiefly because the newcomer is a businessman.

The Secretary of the Interior, who is presently Petroleum Administrator for Defense as well, is the top man in government on petroleum matters.

Although Mr. McKay, unlike his predecessor Oscar L. Chapman, is firmly for state title to the tidelands, his intimates say he has few other ideas about petroleum, as he has had little contact with the industry. This, say oil and gas men, is hardly a drawback, as the past secretaries were similarly poorly-educated in oil when they took over.

The National Petroleum Council, composed of top oil and gas executives who advise the government, looks for continued happy relations under the new Secretary, who appoints the 100-man group.

While the council is convinced Mr. McKay would want the group to continue, this became assured recently as Secretary Chapman, in one of his last official acts, named a new council to serve for the year 1953. This, it was explained, was so that the council could continue in business without fear of any delay until the new secretary became familiar with his job.

Mr. McKay, born in Portland, Oregon, always has been politically-inclined, his record shows. While working his way through Oregon State College, he was chosen president of his freshman class, and he has never lost an election since, in or out of college.

He was in World War I and was wounded badly in the right shoulder. He sold insurance, later automobiles, and in 1927 started his own firm to sell automobiles. He still runs that business.

(Please turn to page 78)

Montage depicting the many testing procedures used by students at the COMSERVPAC school during the nine-week course.

COMSERVPAC
petroleum school

PETROLEUM'S IMPORTANCE in every phase of military operations is responsible for a unique institution established by the United States Navy at Pearl Harbor, Hawaii. It is officially designated as Commander Service Force, U. S. Pacific Fleet Petroleum School.

Started in January, 1949, it has been training men for all services in relation to oil products, including testing, safety, and handling of petroleum as well as storage and transportation. Officer in charge of the school is Lieutenant W. B. King, who was an associate professor of mechanical engineering at Oklahoma Agricultural and Mechanical College.

The school, whose 442 graduates are now assigned to all areas of the Pacific where United States forces operate, is the only one of its kind in the Pacific area, and is believed to be the first of its type in the military establishment. It was originally created to place qualified men in each fleet oiler and gasoline tanker in the Pacific fleet and to train men to apply chemical tests to a large backlog of petroleum products stored at Pearl Harbor which had been returned from World War II bases throughout the Pacific.

The men trained by the Navy school acted as instructors of other service personnel when the school was expanded. A total of 13 classes have been graduated. The fourteenth started October 6, 1952.

Students of the school study a curriculum designed to enable them to become proficient in performance of all petroleum tests required by the Federal Munitions Board, Petroleum Division, except those involving gasoline octane rating. They must also be trained in the handling and storage of petroleum and the exercise of safety precautions necessary in handling inflammable products.

Typical of the topics a student might expect during a week at the school are a Monday lecture and demonstration of model tank farm operations; Tuesday, actual participation in fighting oil and gasoline fires with lectures and demonstrations of safety techniques; Wednesday, refinery processes along with instructions on the structure and purposes of various pumps and valves; Thursday, chemical analysis and lectures on electrolysis processes; Friday, operation of fuel docks and tankers.

A typical class consists of officers and enlisted personnel from the U. S. Navy, Army, Marine Corps, and Air Force. Occasionally, military personnel from Allied nations attend the classes. A class graduates after nine weeks of concentrated study and practical application, and its members are able to cope with almost any petroleum job in the armed services, whether it be rigging a fuel line between a service force fleet oiler and an aircraft carrier of the famed U. S. Seventh Fleet or eliminating the possibility of static electricity's causing a disastrous fire.

Instructors at the school are becoming increasingly proficient in "passing the word along" to students. This group, also from all services, is augmented by giving advanced instructions to the top four men of each class, thus providing a rotation pool of skilled assistants for continued operation of the school.

Students and instructors together have made the Korean fuel line a dependable service. They are men like Navy Chief Petty Officer Samuel Brunison, who is now an instructor, and Jack R. Adams, who recently received commendation from Rear Admiral Francis C. Denebrink for outstanding work in reactivating the naval refueling station at Midway Island at the start of Korean hostilities, and for handling its efficient operation until a permanent crew arrived.

Graduates of the school comprise a vital link in the chain of supply that moves across the Pacific more than half of all overseas shipments, oil, gasoline and other petroleum products, required by the armed forces.

Naval graduates of the COMSERVPAC school are assigned to the four corners of the Pacific, some aboard fleet oilers such as the USS Ashtabula shown refueling the carrier USS Antietam off the coast of Korea.

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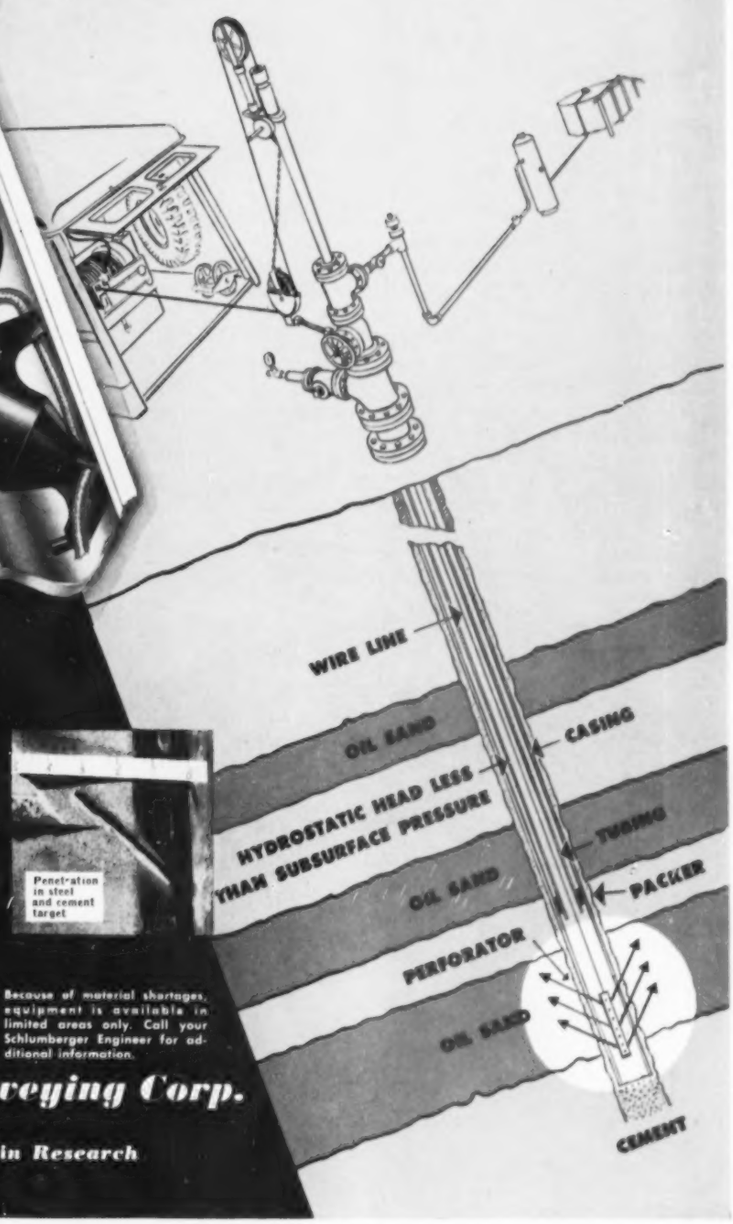
4 *INCREASED SAFETY* — Tubing and well head equipment installed before well is perforated.



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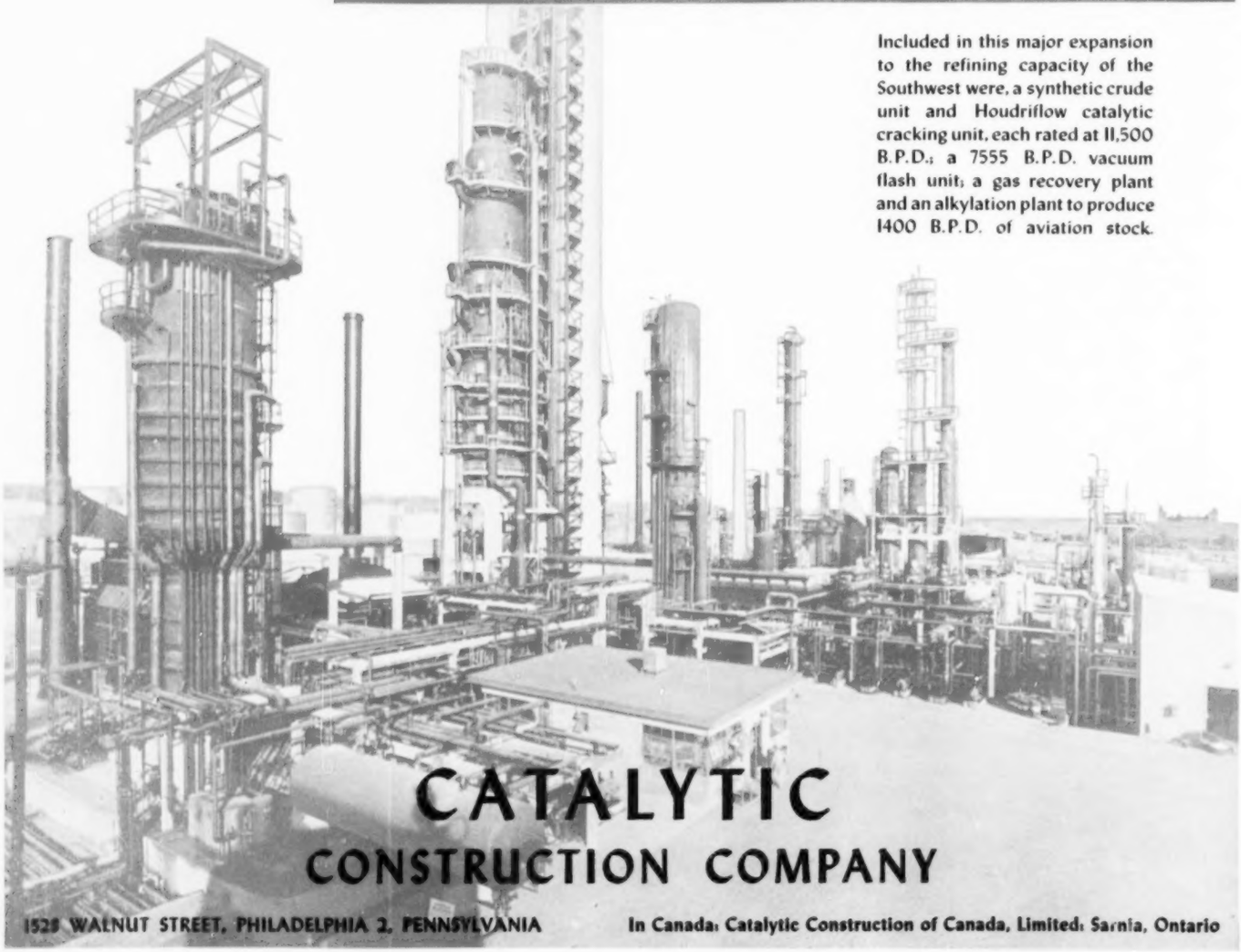

Included in this major expansion to the refining capacity of the Southwest were, a synthetic crude unit and Houdriflow catalytic cracking unit, each rated at 11,500 B.P.D.; a 7555 B.P.D. vacuum flash unit; a gas recovery plant and an alkylation plant to produce 1400 B.P.D. of aviation stock.

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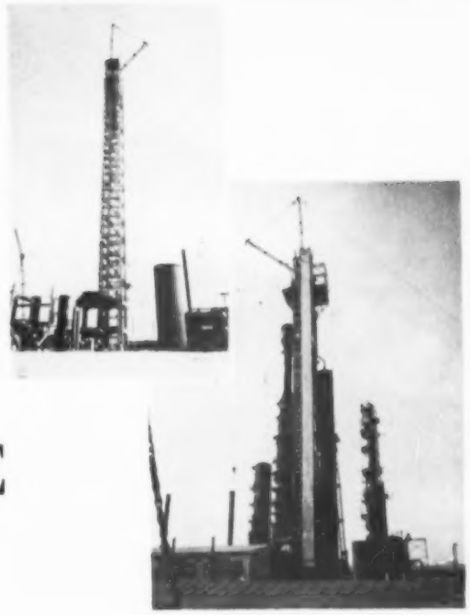

Photos show stairwell with guy derrick mounted on top ready to begin assembly of 11,500 b/d Houdriflow cracking unit, and the same unit nearly completed, the derrick still in position.

ELEVATOR STRUCTURE DOES DOUBLE DUTY

By Alan McCone*

TWO UNUSUAL CONSTRUCTION practices were employed by Catalytic Construction Co. in handling the $10 million refinery expansion program for Standard Oil Company of Texas at El Paso. As a result, the work was completed ahead of schedule and within the budget, despite the added handicap of the steel strike.

The new facilities include a synthetic crude unit and a Houdriflow catalytic cracking unit, each rated at 11,500 b/d, a 7,555 b/d vacuum flash unit, a gas recovery unit, and an alkylation plant. The plant went on stream five days ahead of a target date established as 16 months from the signing of the contract, which covered engineering, procurement and construction. The final cost of the plant was within one percent of the original estimate, in spite of increased cost of materials and fabrication.

One of the erection procedures which contributed greatly to this achievement was the use of the stairwell and elevator shaft of the Houdriflow catalytic cracking unit as a pedestal for the guy derrick. The other unusual practice was the timing of the construction schedule with the materials-delivery schedule so precisely that it was possible to set every major item of equipment in place as it arrived on the job to save the cost of double handling.

The orthodox construction practice for an installation of the type planned for Standard of Texas would have called for erection of a guy derrick of sufficient capacity and range to set top pieces of equipment on the Houdriflow unit, which reached a height of 360 feet. The foundation, erection charges and rental or depreciation of a derrick pedestal for such service frequently costs in the range of $50,000 to $65,000.

The elevator-stairwell structure was to consist of a substructure of reinforced concrete 45½ feet above grade and a steel structure 17 by 21 feet rising more than 300 feet above the concrete pedestal. This structure was designed to support a catalyst elevator 300 feet long on a head shaft 311 feet above grade. The head shaft was calculated to have a reaction weight of 380,000 pounds. The structure was designed to withstand the gravity load and a wind load of 20 pounds per square foot, with a deflection not to exceed 12 inches in a 70-mile wind.

These design conditions would result in a structure which, by the use of guys, would adequately support the required construction derrick, with its 100-foot boom and 25-ton capacity. However, under these conditions, with the limited working area, and by reason of the pedestal itself being guyed, it was clear that each piece of equipment would have to be raised to the top of the structure and rotated 90° before being lowered into place.

It was calculated that by heavying up some of the diagonal bracing in the vertical bents near the top and introducing temporary diagonal bracing in bays not otherwise braced, the structure would support the derrick without guys and the necessity for long lifts could be avoided.

The additional cost of reinforcing this structure was less than $1,000, a negligible amount compared with the saving of time and man-hours required to erect a guyed pedestal for the operation.

The erection of the steel structure was accomplished with a basket pole. As the steel was raised, the derrick mast and boom were assembled within the steel framework. When the steel of the structure was topped off, the derrick was ready to be set and raised immediately. Sections of the kiln and reactor of the Houdriflow unit were prefabricated in the maximum size for the capacity of the derrick before shipment to the job site. In addition to the large sections of the kiln and reactor and the elevator assembly, the derrick set large pre-assembled sections of platform and handrails and large pieces of prefabricated pipe.

The second unusual practice depended more on precise coordination than on novel construction procedure. Again the limited construction area and the lack of accessible storage space indicated the need for setting major equipment in place immediately upon its arrival on the job site.

To accomplish this, accurate delivery dates for all major items had to be established on a schedule that would permit the proper sequence of work in the field. Weekly construction plans were laid with these equipment-delivery schedules as the determining factor. These plans provided only a minimum of flexibility. Strict adherence to them was necessary. Serious delay in equipment deliveries would mean a waste of manpower and elapsed time.

To assure the on-the-job portion of the expediting, access roadways and a railroad spur were constructed directly into the construction area so that equipment could be delivered within reach of the derrick or cranes. In only one instance was there a serious delay in a major item. This was a tower requiring extensive piping, which was off schedule by reason of the steel strike. To minimize the effect of this delay, the piping for this vessel was completed as far as possible with temporary supports in such a manner that the vessel, upon arrival, could be set in place through the framework of piping. By this device the piping work, which would have required approximately 14 working days, was tied in within three days after the arrival of the off-schedule vessel.

Measured by tonnage, 95 percent of the equipment for the Standard of Texas project went directly into final setting immediately upon its arrival. This procedure, in addition to saving the time and the cost of double handling already mentioned, also brought increased efficiency by keeping the construction and storage areas relatively clear of material.

* Manager of Industrial Relations, Catalytic Construction Co.

Truck equipped with spark arrestor-silencer designed for use around petroleum installations and other hazardous locations.

SPARK ARRESTORS AND SILENCERS

By Harold Wiedenman*

PROBABLY THE MOST OFTEN overlooked safety measure in any petroleum drilling or processing installation is the selection of adequate spark arrestors and silencers for internal combustion engines. Fire prevention is obviously important in the petroleum industry because of the nature of the products handled. And yet, every day in hundreds of refineries and drilling operations, unnecessary risks are taken because of inadequate spark arresting.

Any internal combustion engine operating within close proximity of a petroleum installation without adequate spark arresting equipment should be considered a fire hazard. A minute particle of red hot carbon flaking from a cylinder wall, sucked into the exhaust system, and expelled into the atmosphere where an explosive mixture may exist, is all that it takes.

Stationary power units are not the only potential fire bugs around the petroleum installation. Think for a moment of the number of trucks, tractors, compressors, etc., that are operated within close proximity of petroleum installations. Any one of these, if not equipped with spark arrestors, is a potential hazard.

Fortunately, this danger can be reduced greatly. Over the past few years, a considerable amount of study and research has gone into the perfecting of spark arrestors designed to give positive and complete arresting of sparks from all types of internal combustion engines.

One major oil company on the West Coast, learning from experience perhaps, requires that all trucks, tractors, compressors, etc., powered by internal combustion engines, have adequate spark arrestors before they will be permitted into the plant. This includes equipment operated by sub-contractors as well as their own equipment.

Generally speaking, spark arrestors or spark arrestor-silencers are divided into three classes: dry centrifugal type, water spray type, and screen type. Also, any combination of these three can be fabricated, or almost any specific problem can be solved by special engineering.

The centrifugal type uses the principle of centrifugal force. This is done by positioning stationary impellers in the silencer to whirl the gases, so that solids are thrown to the outside of the cyclone and caught by properly placed traps. These traps can then be cleaned by removing conveniently located clean-out plugs. The dry centrifugal type is considered satisfactory for most applications and is automatic in operation. They do not depend upon the human element for operation, nor do they require a water supply.

The water spray type requires a constant source of water which is normally introduced by means of a spray nozzle near the inlet of the silencer. The design should, of course, be such that the water cannot back up into the engine. This type is advantageous in that it serves to quench any live sparks, and also to cool the gases, reducing the possibility of the ignition of combustible mixtures that come in contact with the hot surface of the exhaust system. The spray type, although it must be fabricated of heavier materials due to corrosion and requires a water supply, is the most positive type. It is generally used where the prevention of flying sparks and hot surfaces is extremely important.

The screen type employs a fine mesh to filter out the solids. There are many ways to fabricate such a unit. However, a simple design would be to incorporate a mesh cylinder onto the end of a regular silencer. It can readily be seen that such a unit would have to be cleaned regularly, as the filtering screen would tend to plug and impede the flow of gases, but this type is lower in cost, requires less space, and would be suitable for mobile equipment or where a source of water is not available.

The above types are most generally used. However, air-cooled silencer spark arrestors might also fit into this safety

* President and chief engineer, Kittell Muffler and Engineering Co., Los Angeles, Calif.

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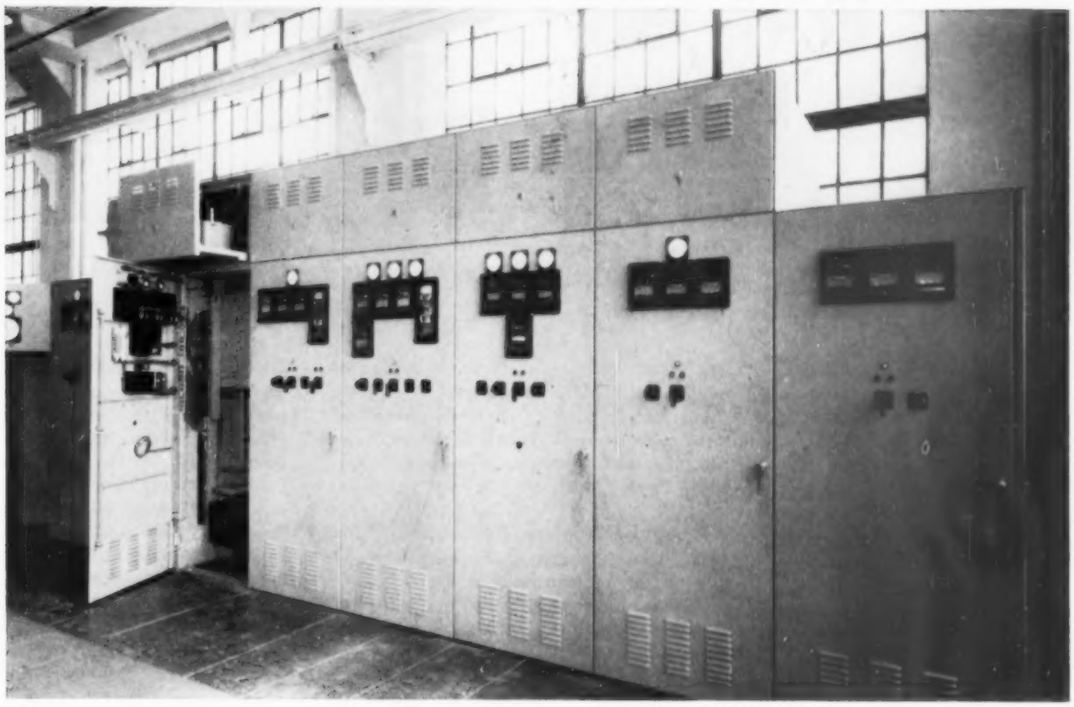

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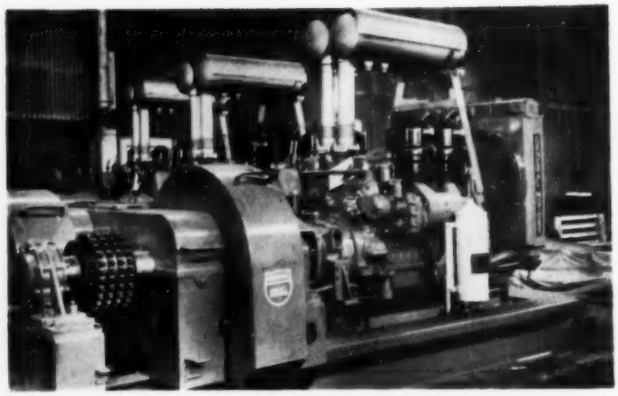
Spark arrestor-silencers mounted on power unit of Ideco portable drilling rig.



National Type 80 drive group with twin six General Motors diesels equipped with twin spark arrestor-mufflers.

discussion. In this type, a metal duct is placed around any silencer or spark arrestor and this duct is coned down to a long stack at the outlet end of the unit. The gases exhausting from the muffler into the stack draw air between the muffler shell and the duct, thereby keeping the outer surfaces at a low temperature for safety purposes.

Now for the noise factor. The reason this subject is being considered in connection with adequate spark arresting is simple. Usually spark arrestors and silencers are combined into one compact unit. They are, however, available as separate units from most manufacturers.

The problem of noise abatement has recently been given a great deal of attention by municipal authorities. This has been brought about largely by results of psychological studies of the effects of noise on human behavior, and the amazing growth of our cities. Areas which a few years ago held nothing but jackrabbit holes and oil derricks are now jampacked with homes. Under these conditions, city planners are re-examining their ordinance books. Many cities have embarked upon a "noise-killing" campaign because the danger of excessive noise has been brought vividly before the public eye. Newspapers have spearheaded the attack as a public service. One prominent midwest metropolitan newspaper, leading the campaign against noise in its home town, said: ". . . we don't know what an unmuffled motor truck explosion may do to case-hardened New Yorkers, but we know what it does to a good many brains in this part of the world. It creates intense, temporary homicidal mania which does not subside for several minutes." Another said: "Noise costs money. It lowers efficiency. It causes waste. It shortens life."

Abatement of noise from pumping installations in oil fields is important only where the field is in an urban area. In the case of natural gasoline plants and pipe line pumping stations, the noise factor will have an effect on personnel in the plant and those living in company houses adjacent to the plant.

Oil refineries in urban areas have become conscious of the public relations aspect of noise as well as of air pollution. Compressor installations and catalytic cracking plants have been offenders.

From a management standpoint, the elimination of noise is a profitable step. One writer on the subject says: ". . . noisy machinery tends to reduce the productive powers of the workers, and it may, through nervous tension, be the possible cause of accidents. In short, noise is one of the heaviest overhead costs in modern business."

Another writer, commenting on the effect on the worker, says: ". . . the fact that hearing is likely to be impaired in those exposed to loud noises actually brings about a deterioration in the efficiency of the worker that shortens his years of profitable activity. This is another example—a cruel example—of the harmful effects of noise on human beings."

Some German experimenters investigating the problem concluded that ". . . noise interferes very seriously with the efficiency of the worker. It lessens attention and makes concentration upon set tasks difficult. The first effect of noise is one of disturbance, of excitation, and of irritation. These effects have consequences of many kinds in conduct. They cause a loss of temper, they play a part in quarrels, and they prevent deep and sustained thinking."

In one study, conducted under scientific methods, a noise reduction of 14.5 percent brought about an increase of 8.8 percent in the work output of typists and a decrease of 24 percent in the number of errors committed. The noise reduction also decreased employee turnover by 47 percent.

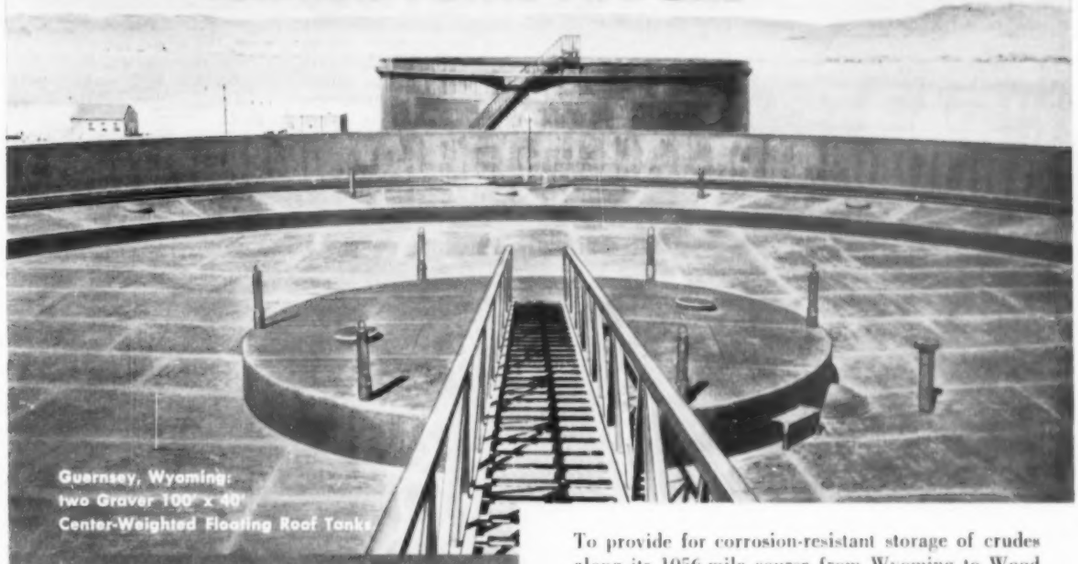
In another factory study, where the subjects were workers doing assembly work on temperature regulators, it was found that production rose 37 percent when their working area was moved from the vicinity of the boiler shop to a quiet area. Errors decreased one-eighth.

Regardless of the results of these and other studies, the fallacy still exists that noise "can be gotten used to." But again, information gathered by scientific methods shows beyond doubt that this isn't so. One doesn't get used to noise. Professor Henry J. Spooner, a member of the International Fatigue Committee of the American Society of Industrial Engineers, says: ". . . most people claim they get used to noise, and that therefore, it does not affect them, but this is a fallacy, as the primary reason why hideous noises are so complacently tolerated is that sound always in the ear is hardly heard; as it is a law of nervous stimulation that a continued activity of any animal structure results in less and less psychic result, and that where a stimulus is always at work it ceases in time to have any appreciable effect . . . although noise may not be heard, the nerve-force suffers; the power of the nerve-pores and corpuscles being affected by the stimulation until it declines by exhaustion."

The conclusions, then, are obvious. Noise problems are reflected in operational efficiency, safety, morale, labor turnover and several other specific areas, all of which accumulate to produce a hidden, but considerable item of overhead cost. This cost should, of course, be minimized wherever possible by the use of anti-noise devices.

Silencers, which are effective in reducing noise levels around compressors, blowers, air intakes, air and gas exhausts—any of which may be pulsating or constant—can have a secondary purpose in the case of internal combustion engine exhausts. By incorporating into the silencer (1) a cyclone-inducing stationary impeller and spark collecting box, (2) a spark screen, or (3) a system for injecting water into the exhaust flow, sparks can be eliminated from the exhaust gases. A safeguard is thus provided against one source of perhaps the most potent potential danger to oil field operations—fire.

GRAVER CENTER-WEIGHTED FLOATING ROOF TANKS
FOR NEW PLATTE PIPE LINE



Guernsey, Wyoming:
two Graver 100' x 40'
Center-Weighted Floating Roof Tanks.

Salisbury, Missouri:
four Graver 134' x 48'
Center-Weighted Floating Roof Tanks.

To provide for corrosion-resistant storage of crudes along its 1056-mile course from Wyoming to Wood River, Ill., the new Platte Pipe Line uses Graver Center-Weighted Floating Roof Tanks at its Guernsey and Gurley injection stations and at its Salisbury pumping station — a total capacity of more than 300,000 barrels.

This new 20-inch line, designed to transport 110,000 b/d from Rocky Mt. fields to refineries, must handle 25 different crudes. Graver's Center-Weighted Floating Roof design — with its inward sloping deck in full contact with the stored crude — assures both the absence of corrosion and the retention of volatile hydrocarbons, since no space exists beneath the single deck for air and vapor to combine and induce corrosion.

GRAVER

Gurley, Nebraska:
one of four Graver 100' x 40'
Center-Weighted Floating Roof Tanks.

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INTERNATIONAL NEWS AND NOTES

Creole to Double Plant Capacity

Creole Petroleum Corp. will double the present capacity of its largest refinery located at Amuay Bay in the Venezuelan state of Falcon from 60,000 to 120,000 barrels daily. When the new installations are completed at Amuay, Creole will refine nearly 200,000 barrels of crude daily at its two Venezuelan refineries located at Amuay and Caripito. Seventy-five percent of this total will be destined for export.

The new installations at Amuay will include a 10,000-barrel fluid hydroformer and will produce 91 octane aviation gasoline, such as is commonly used for air transport in Venezuela, and some components of 100 and 115 octane aviation gasolines for export to other countries. Plant construction will begin in 1953 with completion planned for 1955.

The doubling of the present refining capacity of Amuay will call for a new investment of $35 million, which will bring the total amount of money spent on the Paraguana refinery to $150 million since construction was begun in 1947. An additional $30 million was spent to build the first Ule-Amuay pipe line which brings crude from Lake Maracaibo to Amuay Bay, while an additional $22 million is presently being invested in a second Ule-Amuay line now under construction.

"It gives me the greatest pleasure to be able to announce this major step forward in our company's operations and in the industrialization of the nation," A. T. Proudfit, Creole president, stated. "Our company has been eager to increase the amount of oil refined within the country and we have never made any secret of our intention to increase our refining capacity as soon as it became economically sound to make the necessary investment," he added. "The increases at Amuay are made possible by the increase in demand for oil products, especially for quality motor gasoline, in the Caribbean and South American market areas. As these new markets have opened up, Venezuela has been in a geographically strategic position to supply the demand, compensating to a certain extent for the higher cost of refining here as compared to many other countries. The Creole management has sought to take advantage of all new demand situations for the increase of our refining capacity, whenever these could be economically justified."

When the new plant is completed, Venezuela's total refining capacity will be increased to approximately 400,000 b/d. Through the manufacture of avgas components, the nation will be rendered self-sufficient in any world emergency insofar as its normal domestic aviation fuel requirements are concerned. Some 1,500 persons will be employed in the construction of the new plant and 250 permanent new employees will be required at Amuay. Manufacture of high octane gasoline stock will enhance Venezuela's competitive position in the export market. Sale of these products will also bring a higher financial return to the nation through its share in the earnings of the company.

Gas Permit Denied

Mexico's hopes to export its northern gas to the United States received a severe setback recently when the U. S. Federal Power Commission rejected a plea of the Texas-Ohio Gas Co. of Houston for permission to build a 2,000 mile gas pipe line from the Mexican border to Ohio. The project would have cost $185 million and would have extended from Hidalgo County, Texas to a terminal near Lancaster, Ohio. At the latter point, all the gas would have been sold to the Reserve Natural Gas Co., a new organization. The company had planned to obtain 232,000,000 cubic feet of gas annually from Mexico, 173,000,000 from gasoline plants, and 107,000,000 from Texas fields.

New Oil Zone

A new oil zone has been discovered by Petroleos Mexicanos on the Solis Racienda, where the well Solis No. 109 was recently brought in with an initial production of 600 barrels daily, according to the company. The site of the producer, which has a depth of 740 meters, is only 14 kilometers from Cerro Azul, former rich production center in the state of Veracruz. Two other tests are being put down in the same area and four others will follow.

Mexican Demand Increases

Petroleos Mexicanos will have to meet a growing domestic demand for oil which will probably reach 104 million barrels by 1956 if consumption continues to increase at the same rate as at present—ten percent annually—according to a study by a mixed commission of the Mexican government and the World Bank.

The experts are in accord that much capital now invested in industries of lesser importance could be better employed in developing the country's oil resources.

They added that an increase in Mexico's production, refining and transport facilities is called for if the local demand for petroleum is to be satisfied without a decrease in surpluses available for exportation.

Their estimates indicate Mexico's crude production should rise 8.6 percent a year between 1952 and 1956, and that refining capacity should mount by approximately 110,000 barrels daily, providing existing equipment is improved to the extent of 70 to 85 percent of its present capacity.

Italian Government Oil Participation

The Italian Government, which still controls through the AGIP almost all the activities in the field of drilling and production of oil and natural gas in Italy, is now also entering officially the refining and petrochemicals business. The new agency "Ente Nazionale Idrocarburi" will operate government properties in the oil and natural gas industry under provisions of a bill before the Italian Parliament, which is expected to pass without substantial opposition.

The ENI will group the following participations: 60 percent in the AGIP (the remainder is also completely government-owned through the National Insurance Company, INA, and the Agency for Social Welfare, INPS), 40.6 percent in the ANIC, formerly devoted to synthetic liquid fuel and now to petro-chemistry and nitrogen fertilizers from natural gas (the remainder is privately owned), 50.1 percent in the ROMSA, a mineral oil refinery near Venice (the remainder is also government controlled through the AGIP), 12 percent in the natural gas distribution company SNaM (the remaining 88 percent is in the hands of the AGIP). SNaM has a gas pipe line network in North Italy about 1,000 miles long, with a daily capacity of 5,000,000 cubic meters. The ENI will also be given 50 percent of the other main gas distributing company AMP, with a capacity averaging 700,000 cubic meters daily (other 50 percent of this company is also completely government owned through the AGIP, 14 percent, and the SNaM, 36 percent).

Other participations of the new government agency ANI through the controlled companies are: through the AGIP, 15 percent in the IROM refinery near Venice, in partnership with the Anglo-Iranian Oil Co.; 20 percent in the STEI, a company for the generation of electric power by natural gas; through the ANIC a 49 percent participation in the dye factories ACNA; and a 50-50 partnership with the Standard Oil Co. (N.J.) in the STANIC, which owns the two large refineries in Leghorn and Bari.

Fluor Forms Canadian Company

The Fluor Corporation, Ltd., of Los Angeles, Calif., internationally known engineers, constructors, and manufacturers in the petroleum and allied industries, has announced the activation of the Fluor Corporation of Canada Ltd., a federal corporation. From January 1, 1953, the corporation will occupy permanent offices in the Manufacturer's Life Building in Toronto, Canada.

J. P. Wiseman, who formerly served as vice president and director of sales of the parent company, has been elected president of the Canadian firm. John G. Marshall, formerly chief engineer of the Fluor Corporation Ltd., has been elected vice president in charge of engineering, and D. H. White of Fluor's Chicago office is being transferred to Toronto to handle the sale of Fluor's manufactured products throughout Canada. George B. Foster of the legal firm of Foster, Hannen, Watt & Stikeman, Montreal, is a director and general counsel for the Canadian affiliate.

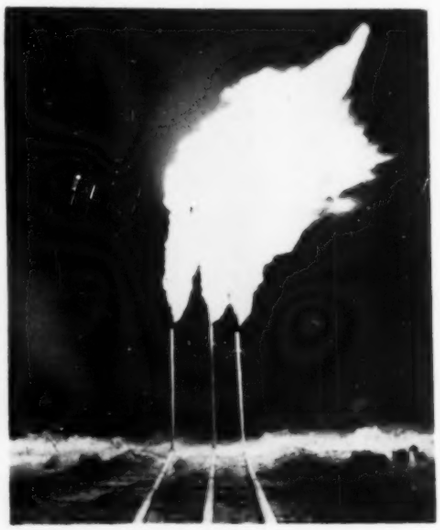
Engineering, design and material procurement on all new projects to be constructed by Fluor in Canada will be handled by the Canadian affiliate which is currently engaged in the engineering, design and construction of facilities for Shell Oil Company at Vancouver and Imperial Oil Ltd. at Regina, as well as the installation of numerous cooling towers throughout Canada.

Fluor also maintains manufacturing facilities for prefabricated cooling towers at Vancouver, B. C. and a district office at Calgary, under the supervision of P. D. Mellon, formerly an officer of the Canadian Western Gas Company.

Pakistan Gas Discovery

A natural gas pool has been discovered in Sui, Dera Bugti of Baluchistan, in the first well drilled there by Pakistan Petroleum Ltd. The well is being tested to determine its potential and another well is about to be drilled in the same area. Discussions are being held between the government and the company regarding probable utilization of this gas.

Pakistan Petroleum Ltd. started drilling the first well in the arid Sui desert on October 10, 1951, and drilled the well to a final depth of 10,049 feet in July of this year. Production tests have been made at various levels in the well without finding any oil.

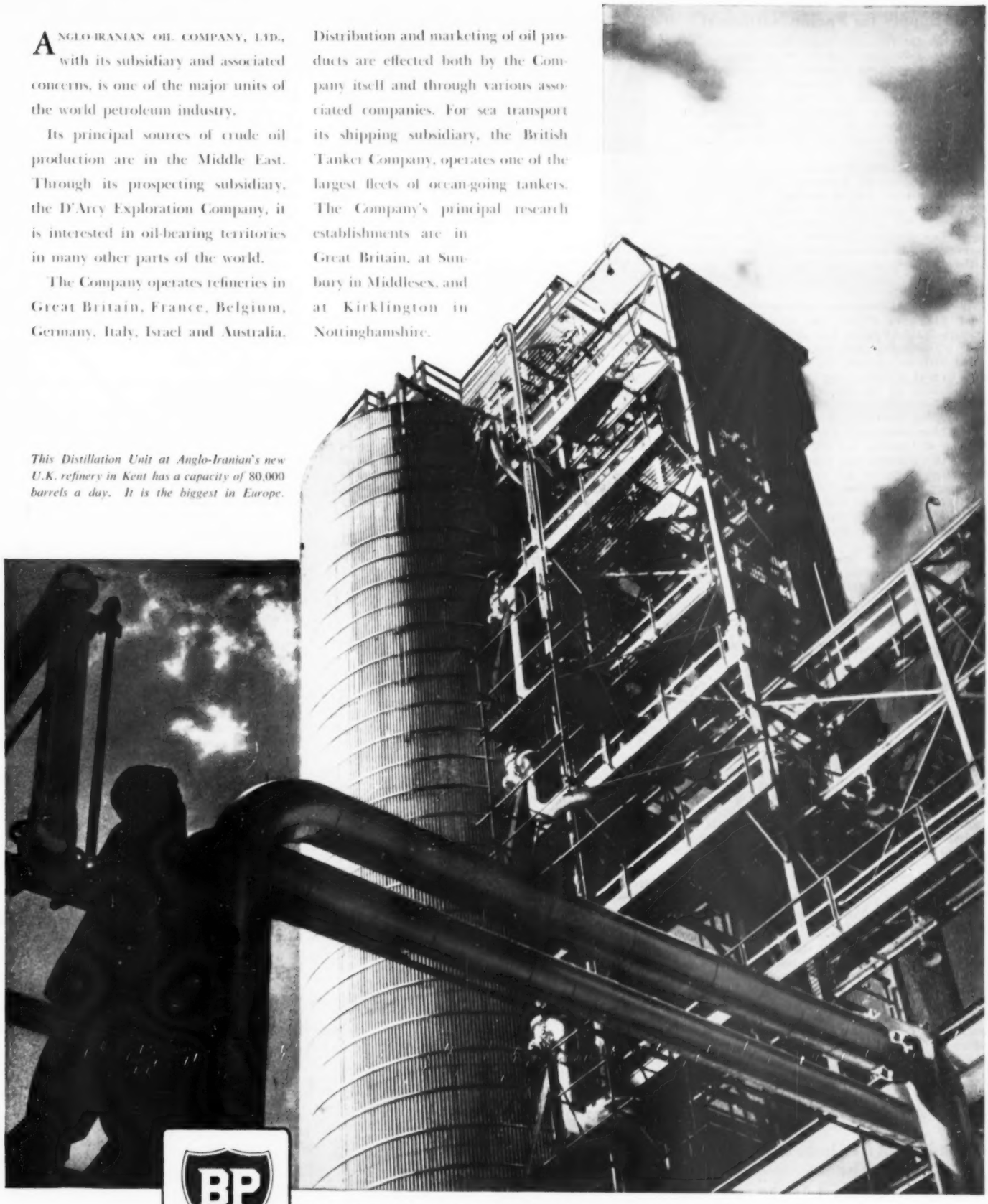


Natural gas flare at Sui well No. 1 during production test.

ANGLO-IRANIAN OIL COMPANY, LTD., with its subsidiary and associated concerns, is one of the major units of the world petroleum industry.

Its principal sources of crude oil production are in the Middle East. Through its prospecting subsidiary, the D'Arcy Exploration Company, it is interested in oil-bearing territories in many other parts of the world.

The Company operates refineries in Great Britain, France, Belgium, Germany, Italy, Israel and Australia. Distribution and marketing of oil products are effected both by the Company itself and through various associated companies. For sea transport its shipping subsidiary, the British Tanker Company, operates one of the largest fleets of ocean-going tankers. The Company's principal research establishments are in Great Britain, at Sunbury in Middlesex, and at Kirklington in Nottinghamshire.



This Distillation Unit at Anglo-Iranian's new U.K. refinery in Kent has a capacity of 80,000 *barrels a day. It is the biggest in Europe.*

THE BP SHIELD IS THE SYMBOL OF THE WORLD-WIDE ORGANISATION OF

Anglo-Iranian Oil Company

LIMITED

REPRESENTATIVE IN U.S.A.: A. E. C. DRAKE, 610 FIFTH AVENUE, NEW YORK 20, N.Y.

Gas Supply for Pacific Northwest

Natural gas from the Peace River districts of Alberta and British Columbia could be piped to the Pacific Coast area of British Columbia, Washington and Oregon by Christmas of 1953 or early 1954 if final approval is obtained early enough from the Federal Power Commission which re-opens its hearing on Westcoast Transmission Company's bid to export gas to the United States on February 16.

George McMahon, president of Pacific Petroleums, an affiliate of Westcoast, made this prediction December 4 at a meeting of the Northwest Mining Association in Spokane. Mr. McMahon told his audience that British Columbia now ranks just behind Alberta in area under reservation with a total of 36 million acres. Prior to the discovery of oil by Pacific Petroleums in November 1951, total acreage was less than 11 million.

The Fort St. John area, where oil was first found, has since yielded gas in eight separate zones in formations of four different geological ages. In all these zones the gas is heavily saturated with condensate. Oil showings have been found in four of these zones.

Main lines of the Westcoast pipe line from Fort St. John would total 683 miles to Vancouver with distance to Portland being 960 miles. Dr. G. S. Hume, chief geologist for the federal government of Canada, has estimated gas reserves in British Columbia and Alberta sections of the Peace River area at 2.5 trillion cubic feet. "It would not be surprising," the report states, "if structures within the Fort St. John area now under development comprise the greatest reserves of any area in Western Canada including Pincher Creek."

The Hume report resulted in the Board of Transport Commissioners at Ottawa giving Westcoast permission to build the line to the United States border.

Gasoline Prices

Since November 1 service stations in Sao Paulo have been selling gasoline to which five percent of anhydrous alcohol has been added. This measure, which has not been enforced since 1949 in South Brazil, has been re-introduced to save exchange. In future, 10 percent alcohol will be added in the Federal District, and in Pernambuco, the big sugar-growing state, the percentage will be raised from 20 to 25.

As the oil companies will have to purchase anhydrous alcohol from the National Sugar Institute at 24¾ U. S. cents per litre, the cost of gasoline to the public will be adjusted accordingly, probably from 10.89 to 11.55 cents per litre.

Oil Monument

Petroleos Mexicanos recently unveiled a "Monument to the Oil Industry" in the fashionable Chapultepec Heights residential development overlooking Mexico City. The industry is symbolized by a beautiful woman emerging from a refinery. With her are two male escorts, the manual worker and the technician. In the background is an oil field in full production, with drilling rigs, railway lines and a refinery. Below the figures are a fountain and several basins. No oil flows through this symbol of the distribution of petroleum throughout the republic, however—only water.

Nomads Will Be Hosts to Oil Show Visitors

Representatives of the oil industry in at least 50 nations are expected to attend the International Petroleum Exposition to be held at Tulsa next May. Members of the Nomads will act as hosts to international delegates. The National Board of Regents of the organization has set up a number of committees to deal with such matters as reception, registration, attendance, housing and transportation and to extend personal courtesies to the visitors.

Visitors at the November New York Chapter of Nomad's party at the Stork Club in New York City included, left to right: R. W. Parker, California-Texas Oil Co., Australia; Granville Parker, The Texas Co., Bogota, Colombia; E. C. Hendrix, International General Electric Co., Caracas, Venezuela; Dennis Slatford, Trinidad Oilfield Service Ltd., Trinidad, B.W.I.; George Lockett, Mene Grande Oil Co., Maracaibo, Venezuela; Carlos Bejarano, Motores, S.A., Bogota, Colombia; and J. Feger, SNPA, Paris, France.

New Bahrein Oil Terms

By Decree of December 6, 1952, promulgated by his Highness, Shaikh Sulman bin Hamad al Kahlifah, K.C.M.G., K.C.I.E., ruler of Bahrein, a new tax was imposed.

Under this decree a 50-50 income tax is levied on companies engaged in the production of crude petroleum in Bahrein. The tax applies only to net income from the production and sale of Bahrein crude beginning January 1, 1952. On December 15, 1952, the decree was made applicable to foreign companies operating in Bahrein.

A spokesman for the Caltex group of companies has announced that The Bahrein Petroleum Company Ltd. has formally notified the authorities concerned that it will submit to the new tax.

New Brazilian Tanker

S. S. Goias, the 18,525 ton tanker recently incorporated in the Brazilian fleet, was built by the Netherland Dock and Shipbuilding Co. of Amsterdam. Two more units, the *Minas Geraes* and the *Sao Paulo*, are due to arrive in Brazil shortly. The *Minas Geraes* was delivered to the Brazilian authorities in Holland at the end of October.

These latest acquisitions bring Brazil's fleet up to 22 vessels, with a total deadweight rating of 223,000 tons. Twelve are of 16,000 tons or over, capable of carrying 2,000,000 tons of crude and derivatives annually from the West Indies to Rio and Santos. This means that, for the present, Brazil will have to rely on foreign tankers to transport approximately 5,000,000 tons, the balance of the country's annual requirements. In order to reduce freight charges in dollars, calculated at 34 million, the government proposes to engage vessels under time charter, to be freighted to oil companies working to Brazil.

The war-time agreement with Venezuela to supply Brazil with 40,000 barrels of oil daily has been renewed for another 12 months. In exchange, Brazil will ship farm and pharmaceutical products to Venezuela.

Among guests at the November meeting of Houston Nomads were, left to right: W. G. Berry, A-Z Export S.A., Maracaibo, Venezuela; T. P. Whittaker, National Supply Export Co.; H. W. R. Wardlaw, Asiatic Petroleum Co.; Wm. Golden, CIMA, Mexico City; and Orlan G. Webb, Baker Transworld, Maracaibo, Venezuela.

Colombia Modifies Oil Law

A decree issued by the government of Colombia provides for the admission of oil industry equipment free of customs charges and modifies regulations heretofore existing affecting pipe lines. Most importantly, it eliminates the requirements for revision of such properties to the government after 30 or 40 years of operation. The term of concessions in the eastern and southern sections of the country (beyond the Eastern Cordillera) is extended from 30 to 40 years and the limitation of the area of concessions to 2,000,000 hectares is removed. Any producer or refiner in this eastern area is permitted to construct a private pipe line for transportation of his output. Common carrier pipe lines can be constructed only by authorization of the government.

Purpose of the changes in the law is to encourage exploration and development of the great transmountain portion of Colombia which presents difficult transportation problems and in which the costs of exploration and exploitation consequently are high.

Mild Weather Aids Pipe Line Work

Continued mild weather in western Canada aided progress on construction of the Trans Mountain pipe line right up to the close of the working season on December 1. Up to that date, 325 miles of pipe had been laid out of the total length of 711 miles. Work will be resumed in the spring as soon as weather permits, with completion expected by August, 1953. If this schedule can be maintained, oil is expected to be flowing through the line by next October.

During the winter months inside work on pump stations will continue and settings for engines, pumps and other equipment will be prepared.

First Two Cat Crackers in Italy

At the Rome and Genoa refineries of the independent oil company Permolio S.p.A., TCC catalytic cracking units are almost complete. The two units, of 1.500 b/d each, will operate on Middle East crude fractions, and will give 80 O.N. clear gasoline.

The Permolio company is now putting in its own sales and distribution service. The company, which was previously marketing lubricating oils and selling its gasoline through other companies, is now entering the Italian market directly under the trade name of "Octangas".

Brazilian Petroleum Bill

The Brazilian petroleum bill, as amended and approved in the Chamber of Deputies, has reached the Senate and is now before the Special Commission which must report on its constitutional and legal aspects. The leader of this commission has suggested two alterations, both referring to the proposed system of taxing petroleum products.

It has been pointed out that, if approved as it stands, the bill will increase the tax on gasoline by 69.9 percent, on diesel oil by 64.7 percent, and on fuel oil by 155.3 percent.

Named New Continental President

Sir Robert Watson-Watt, renowned British scientist who pioneered in the development of radar, has been named as president of the New Continental Oil Company of Canada, Ltd. New Continental, with large producing properties in Western Canada and Texas, recently has begun research into the use of electronics for oil exploration in an effort to reduce the cost and waste of "dry hole" drillings, and Sir Robert has been advising the company on these matters.

Bahrein Crude Production

For the month of November the production of crude oil in Bahrein was 905,363 barrels, an average of 30,179 barrels daily.

Royal Sulphuric Acid Works

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are now building on their sites in Amsterdam,
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according to the processes of
AMERICAN CYANAMID COMPANY
New York.

THIS PLANT WILL START PRODUCTION IN 1953

OIL COMPANY STAFF CHANGES

J. C. DUCOMMUN has been appointed assistant general manager of manufacturing for Standard Oil Co., Ind. He formerly was manager of Standard's refinery at Whiting, Ind. A. F. Endres succeeds Mr. Ducommun at Whiting and is, in turn, succeeded as general superintendent by A. H. Hayes, his former assistant.

Mr. Ducommun joined the company in 1929 as a member of the engineering department at Whiting. He organized the engineering inspection department in 1932. He became assistant general superintendent of the refinery in 1944 and manager in 1948.

Mr. Endres joined Standard in 1923 as a chemical engineer in the research department. In 1929 he was transferred to the manufacturing department. He was advanced to assistant general superintendent of the refinery in 1946 and to general superintendent in 1950.

Mr. Hayes joined the company in 1930 as a chemist. He became superintendent of the light oil division at the refinery in 1946 and was advanced to assistant general superintendent in 1948.

R. F. BRUCE TAYLOR has been elected treasurer of Trans Mountain Oil Pipeline, according to an announcement by Robert L. Bridges, company president. Born in Aberdeen, Scotland, Mr. Taylor came to Canada in 1911. He studied civil engineering at the Royal Military College in Kingston and graduated from Queens University in 1924. He joined Canadian Bechtel Ltd. in connection with the financial problems of that company as agent for Trans Mountain. Mr. Taylor will move from Toronto to Vancouver where the operating headquarters of the Trans Mountain company have been established.

F. W. BORDEN, Los Angeles, Calif., has been named manager of California district operations for Sunray Oil Corp., succeeding R. E. Foss, recently transferred to the company's general offices in Tulsa as vice president and manager of the company's exploitation department. Mr. Borden joined Sunray in 1930 as a roustabout. In 1948 he became general production superintendent in charge of all the company's California production operations and in May of 1952 was appointed general superintendent of the California district.

A. W. McKINNEY, executive vice president of The National Supply Co., was elected president of the Diesel Engine Manufacturers Association at its recent annual meeting at New York. Mr. McKinney joined National Supply in 1920 and was elected executive vice president in 1948.

A. W. McKinney

FRED M. CLEMENT, Denver, Colo., and Wayne E. Glenn, Los Angeles, Calif., have been promoted to new production department positions with Continental Oil Co. Mr. Clement, assistant production manager of Conoco's Rocky Mountain region, has been promoted to production manager of the company's central region, with headquarters at Oklahoma City. Mr. Glenn, western region petroleum engineer for the past five years, has been named to succeed Mr. Clement at Denver.

Mr. Clement joined Continental in 1941 as a roustabout in the Jal, N. M., area. He has been assistant production manager of the Rocky Mountain region since 1948. Mr. Glenn's first job with Conoco was in 1943 as a petroleum engineer at Hobbs. He was transferred to company offices in Ponca City, Okla., in 1944 and to Los Angeles three years later.

CHARLES R. HETHERINGTON, formerly of Ford, Bacon and Davis, Inc., engineers of New York, has been appointed vice president of Westcoast Transmission Company Ltd. of Calgary, according to an announcement by Westcoast president Frank McMahon.

Mr. Hetherington has been associated with Westcoast for more than three years and collected the technical evidence on the natural gas pipe line which Westcoast plans to build from the Peace River area of British Columbia and Alberta for presentation to the Alberta Conservation Board and the Canadian Board of Transport Commissioners.

A graduate of Oklahoma University in chemical engineering and of the Massachusetts Institute of Technology with the degree ScD, he has spent nearly all his business career in the petroleum and natural gas industry in the refining, petrochemical and pipeline divisions.

RICHARD E. LAUTERBACH has been named manager of the newly announced $35 million refinery to be built in Ferndale, Washington, by the General Petroleum Corp. He is now assistant manager of General's Torrance, Calif., refinery. For the initial portion of the two-year construction period of the 35,000 b/d Ferndale refinery, Mr. Lauterbach will make his headquarters at General Petroleum's home office in Los Angeles. Later he will move to the Ferndale area. Mr. Lauterbach joined General Petroleum in 1936 as a laboratory assistant. He became a chemical engineer in 1939 and assistant manager at Torrance in 1950.

DR. ELY MENCHER, formerly senior field geologist and research geologist with the Socony-Vacuum Oil Co. of Venezuela, has been appointed associate professor of geology in the department of geology and geophysics at the Massachusetts Institute of Technology. He will conduct courses in stratigraphy and petroleum geology and will continue his research on the geology of South America.

PAUL SANDERS has been named assistant manager of General Petroleum's Torrance (Calif.) refinery and E. G. Surber has been advanced to the post of superintendent.

Mr. Sanders has been superintendent of the refinery since 1945. In February, 1929, he helped put the refinery on stream.

Mr. Surber is another veteran who has been with General Petroleum since 1923.

W. H. BURGE of the Oronite Chemical Co., subsidiary of Standard Oil Co. of California, has been transferred from San Francisco to New York as sales manager.

H. H. KAVELER, assistant manager of the production department of Phillips Petroleum Co., resigned Nov. 1 to become a general consultant at Tulsa. L. E. Fitzjarrald will continue as manager and John Houchin as general superintendent of the department. The position of assistant manager will be discontinued. Jack Tarner, now chief reservoir engineer, will become technical advisor to the manager and will be in charge of reservoir studies, unitization and proration.

Dr. Kaveler has been with Phillips since 1936, during which period he has become known as an authority on petroleum technology. He has contributed papers to many technical society meetings and has been active in association work. He has been chairman of the operating committee of a number of unitized fields.

HOLLIS D. HEDBERG has been named chief of the geology and geophysics section of the land and exploration branch of the production department of Gulf Oil Corp. He will supervise and direct staff activities in the fields of geology and geophysics in the Pittsburgh office of the department.

Mr. Hedberg joined Gulf in 1928 as a stratigrapher and director of the geological laboratory in Maracaibo, Venezuela. In 1939 he was appointed assistant chief geologist of Gulf's Mene Grande operations. He was transferred to New York as chief geologist and exploration advisor in 1946, and in 1951 was appointed manager of exploration, serving in that capacity until his most recent promotion and transfer to the Pittsburgh office.

B. BREWSTER JENNINGS, president of Socony Vacuum Oil Co., has been presented with the Distinguished Service Award of the United States Navy, the highest civilian award which may be bestowed by the Navy. Dan A. Kimball, Secretary of the Navy, cited Mr. Jennings' services to the nation during World War II at the ceremonies attendant upon the award. He served for two years as deputy administrator for tanker operations of the War Shipping Administration.

BRUCE F. GRANT, formerly of the U. S. Bureau of Mines, has joined the Sinclair Research Laboratories, Inc. as director of the petroleum engineering division. He will make his headquarters at Tulsa. Mr. Grant recently was in charge of designing and planning petroleum research facilities at the new Morgantown, West Virginia station of the U. S. Bureau of Mines. He will devote his time largely to research in the field of secondary recovery.

B. F. Grant

"Through the development of its resources society acquires skilled workers and technicians and a vast storehouse of knowledge with which to make further progress. Man's greatest resource is his own resourcefulness."

STANDARD OIL COMPANY
(NEW JERSEY)
AND AFFILIATED COMPANIES

PAUL E. TALIFERRO has been elected executive vice president of Sunray Oil Corp., a new position. He has been vice president and assistant to the president. As part of a move to consolidate California and mid-continent division operations, a number of other executive changes were made.

H. O. Harder has been made vice president in charge of exploration and land department, while R. E. Foss has been transferred from Los Angeles to Tulsa as vice president in charge of exploitation. Vice President H. W. Manley will manage manufacturing, sales and pipe lines in California as well as in the mid-continent.

JOHN T. ROUSE has been appointed manager of exploration for Socony-Vacuum Exploration Co. at Casper, Wyo., and James C. Menefee nas been named chief geophysicist of the new company.

Mr. Rouse has been a staff geologist for Magnolia Petroleum Co. at Dallas, and Mr. Menefee was formerly assistant director of geophysical exploration for Magnolia.

CHARLES S. MITCHELL, president of Cities Service Pipe Line Co., has been elected vice-president of Cities Service Oil Co. (Del.). He has been with Cities Service since 1930 when he joined the company as a junior engineer. Prior to his election as president of the pipe line company, he was manager of the crude oil supply and transportation division of Cities Service Oil Co., a position he still holds.

FRANCIS A. CLARK has been appointed manager of the national accounts division of Sinclair Refining Co. He succeeds William Fletcher Farrell, recently named assistant sales manager. Mr. Clark will coordinate the company's petroleum product service to national industrial accounts throughout Sinclair's 34-state operating area.

Britt Joins Delta Engineering

J. R. Britt

James R. Britt recently joined Delta Engineering Corp. of Houston as manager of its construction division. Mr. Britt entered the oil and gas field as a plant engineer for Cities Service in 1936. He was superintendent of the natural gasoline division of Arkansas Fuel Oil Co. before joining Delta.

JOHN K. DUSTMAN of Bronxville, N. Y. has been appointed manager of export sales in the New York office of the Youngstown Sheet and Tube Company. He succeeds Walter A. Davis, deceased. Mr. Dustman is a native of Hubbard Township, O., and attended public schools in Hubbard and Youngstown. He joined the Youngstown Sheet and Tube Company in 1917 as a tally clerk. In 1922 he was transferred to the pricing department and in 1939 was moved to the New York office as a salesman in the export department.

ARTHUR F. TURMAN has been appointed chief petroleum engineer for the Standard Oil Company of California's producing department in the San Francisco home office. He succeeds W. A. Eardley, who was recently appointed manager of the department's northern district at Taft, Calif.

J. T. Crooker, previously supervising petroleum engineer for the producing department at Taft, succeeds Mr. Turman as assistant chief petroleum engineer at San Francisco.

DR. EGER V. MURPHREE, president of the Standard Oil Development Co., central research and engineering affiliate of the Standard Oil Company (N.J.), has been named as the 1953 recipient of the Industrial Research Institute Medal. The medal has been awarded annually since 1945 to honor "outstanding accomplishment in leadership in or management of industrial research which contributes broadly to the development of industry or the public welfare."

H. J. WHARTON has been named chief exploitation engineer at Pittsburgh headquarters of Gulf Oil Corp. He will review, analyze and process engineering programs, projects and problems for executive consideration. A. H. Stoecker has been named chief of the economics section in the fiscal branch of the production department. Previously both men were with the company's foreign production division with headquarters in New York.

RAY ALTHOUSE, executive vice president of Royalite Oil Co., Ltd., has been appointed a director to succeed K. H. Houston, resigned. Mr. Althouse came to Royalite last May after resigning as executive assistant of Cities Service Oil Co. (Del.). Mr. Houston, who has been with Royalite for 29 years and a director of the company since April, 1946, has resigned to enter the oil well drilling business.

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CAST STEEL REFINERY FITTINGS
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Cast in all types of steel for all pipe sizes, are of rugged construction, thoroughly dependable, and will give years of trouble free service.
All Osborn fittings are interchangeable with those made by Ohio Steel Foundry Co., being made in accordance with Ohio designs.
Catalogues will be sent upon request.
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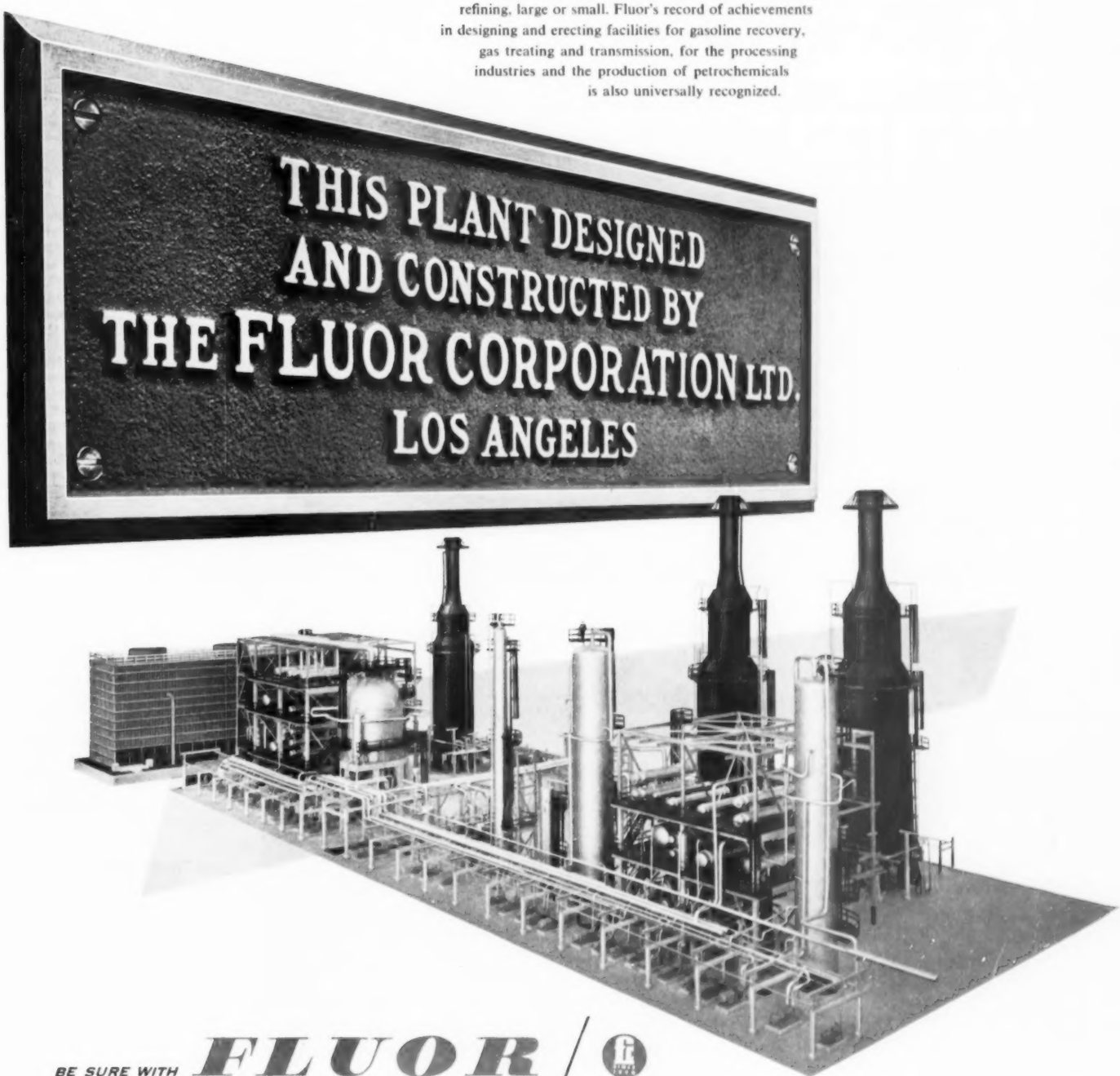
CLYDE STEEL WORKS, SHEFFIELD

WILMINGTON, CALIFORNIA. The Crude Distillation and Vacuum Flashing Unit recently added during Union Oil's $26½ million refinery expansion program at Wilmington was designed, engineered and constructed by the Fluor Corporation, Ltd. Fluor also built many of the offsite facilities and interconnecting pipelines within the specified time and allocation. This is another example of Fluor's ability to handle any phase of petroleum refining, large or small. Fluor's record of achievements in designing and erecting facilities for gasoline recovery, gas treating and transmission, for the processing industries and the production of petrochemicals is also universally recognized.



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New G. E. Bulletin

A new 20-page bulletin on equipment for the generation, transmission, distribution, and utilization of electric power in oil field and pipe line applications has been announced as available from the General Electric Company, Schenectady 5, N. Y. Bulletin GEC-926 discusses operational problems of deep-well drilling and oil well and pipe line pumping. Included are charts, tables, graphs, and product photographs to aid in selecting the proper motors, controls, transformers, switchgear, etc.

Book Review

Arabia Reborn, by George Kheirallah; published 1952 by University of New Mexico Press, Albuquerque, N. Mex.; 307 pages.

The author of this engrossing book is an Egyptian-born American Muslim who has combined a distinguished medical career in the United States with authorship of a number of books on the Arab world. His present work is the story of today's Saudi Arabia under its phenomenal King Abdul Aziz ibn Saud, who in forty years of a stormy career has succeeded in bringing the vast Arabian peninsula under his rule. Much of the book is devoted to the history of Arabia and to the wars of Abdul Aziz.

In the later chapters is told the story of Arabian oil and of how Abdul Aziz is using the wealth that oil has brought him to better the agricultural, economic and social condition of his people. The author does not fail to give full credit to the Arabian American Oil Company for going out of its way to help the Saudians with technical assistance in works of improvement and to Abdul Aziz himself for his sagacity in getting along with the helpful oil men. Unlike some rulers of the Middle East, Abdul Aziz knows a good thing when he sees it and has displayed no inclination to kill the goose that lays him such golden eggs.

The picture above shows Ted Sutter, left, as he received a 30-year service pin from R. C. Baker, Sr., founder and president of Baker Oil Tools, at the annual banquet of the company in Pasadena. Both seem to be enjoying the situation. Ted joined the Baker organization in 1922 as office manager. Over the years he has risen to the position of executive vice president and general manager. During the same period he has been honored with many important positions in oil industry associations and has become one of the most widely known men in the industry.

Largest Platformer

Standard Oil Co. of California has completed a 12,000-barrel UOP Platforming unit at its El Segundo refinery, the largest Platformer yet placed on stream. The unit will operate on a blocked-out basis, producing high octane motor fuel approximately half the time and an aromatic concentrate during the other period. When operating for motor fuel output, the unit will charge approximately 12,100 barrels per day, with a yield estimated at 10,720 barrels of debutanized motor fuel daily.

On its aromatics run, the Platformer will charge 10,200 barrels per day with an estimated yield of aromatic concentrate of 8,740 barrels. Standard will separate benzene and toluene from this concentrate.

New Steering Axle

A new steering pusher axle with payload and load tolerance advantages for tractors in highway transport service has been developed by The White Motor Co. The new steering axle is a lightweight, single wheel axle mounted ahead of the driving axle. It weighs only 1,350 pounds with 10.00 x 20 tires and steers in coordination with the tractor's front axle steering. Tractors with the steering pusher will legally haul approximately 4,000 pounds more payload than comparable tractors not equipped with the new unit and can be interchanged with all trailers.

Book Review

Mineral Resources of the World, by William Van Royan and Oliver Bowles, published 1952 for the University of Maryland by Prentice-Hall, Inc.; 181 pages; 13¼ x 10 inches; $10.75.

This is Part II of an Atlas of World Resources and is a geographical study of the distribution of the world's resources of coal, water power, petroleum, and 28 of the most important metal and non-metallic products that figure in world trade. This information is conveyed mostly by maps showing distribution by hemispheres, by continents and countries, and more restricted regions. Occurrence, methods of production, and preparation of the raw products are succinctly described.

The chapter on petroleum, written by John W. Frey of the American Petroleum Institute, occupies 15 pages of the book. As with the other minerals, distribution of petroleum is shown by maps, including maps of general regions where additional petroleum reserves may possibly be found. The maps necessarily are largely generalized and cannot show much detail. The work is intended for students, business men and others interested in the basic foundation of our own economy and that of the world at large.

Three Famous names in Transport—

A Thornycroft petrol engined "STURDY STAR" pumping unit, coupled to a 1,500 gallon capacity semi-trailer, refuelling B.O.A.C.'s record breaking "Comet".

Two Thornycroft fuellers can normally refuel the "Comet" with 3,000 gallons in less than 10 minutes.

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For BIG Selection in L-P Gas Piping Equipment See the CRANE Line First

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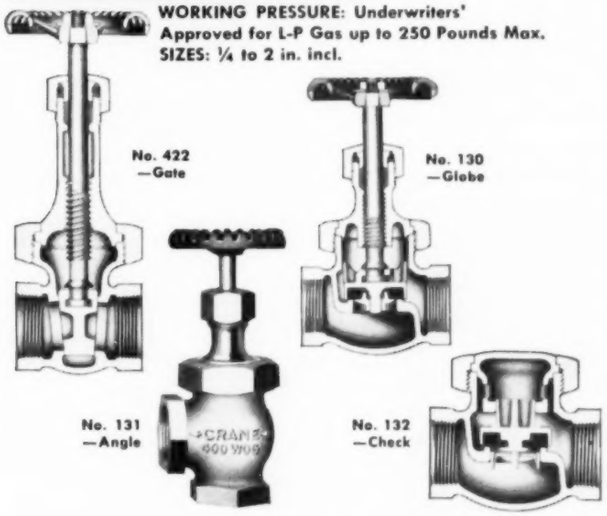

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Globe and Angle Valves have composition disc with easy-to-change slip-on disc connection.

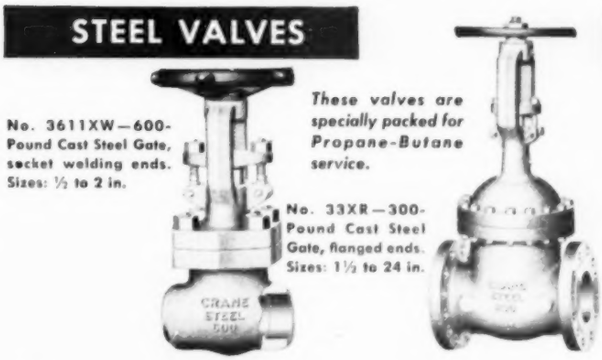
For producer, distributor, and large user—for every need in L-P Gas handling—Crane is where you get the BIG selection of quality piping materials.

You'll have your choice of valves, pipe fittings, and unions in service approved design, in brass, steel and iron.

With the help of Crane Co.'s accurate service recommendations, you'll enjoy maximum safety and dependability in L-P Gas piping, with low ultimate piping equipment costs. With Crane Quality in every item, you'll be protected against high maintenance expense.

See the big selection you get—in your Crane Catalog, or talk it over with your local Crane Representative.

STEEL VALVES



No. 3611XW—600-Pound Cast Steel Gate, socket welding ends. Sizes: ½ to 2 in.

These valves are specially packed for Propane-Butane service.

No. 33XR—300-Pound Cast Steel Gate, flanged ends. Sizes: 1½ to 24 in.

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No. 198E—300-Pound Malleable Iron Female Union. Sizes: ⅛ to 4 in.

No. 260E—300-Pound Malleable Iron 90° Elbow. Sizes: ⅛ to 6 in.

No. 1240—2000-Pound Forged Steel Socket Welding Elbow. Sizes: ⅛ to 4 in.

CRANE VALVES

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Ed Dewey

Ed Dewey Joins Fluor

Ed Dewey has been appointed supervisor of sales promotion for the Fluor Corporation, Ltd., Los Angeles. For six years Mr. Dewey has been with Dozier-Eastman and Co., Los Angeles industrial advertising agency, and for the past four years he has been account executive servicing Fluor advertising, merchandising, sales promotion and a recruiting drive for skilled help in Saudi Arabia. Mr. Dewey worked as an oil field representative for Jones and Laughlin Supply in Tulsa, for Republic Supply of Texas, as a feature writer for Oklahoma newspapers, and as an account executive for Rogers, Gano and Gibbons Advertising Agency in Tulsa, where he serviced oil tool and refinery equipment manufacturers. During World War II, he served in Africa as technician of gyroscopic flight instruments and for two years with the aviation division of the Marine Corps.

McKee Training Program

Arthur G. McKee & Company has instituted an extensive training program, under the direction of its personnel department with John F. Walker as training director, to provide company personnel with an opportunity to learn about all phases of the company's management, engineering, and construction operations. A series of four orientation and indoctrination meetings, to which all company employees, regardless of position, were invited, was held over a four-week period. In this series, employees received detailed information on the history of the company, reports on the operating procedure of the various divisions and departments, and an outline of the personal qualifications required for typical positions.

During the orientation and indoctrination series, meetings were held with departmental supervisors, assistants, and squad leaders for the purpose of establishing plans for the technical phases of the program. As a result of these meetings with the training director, two introductory courses were set up for this fall and winter. One is concerned with refinery process design, the other with steel plant design. The former is a survey course of all important refinery processes and is being presented by the staff of the process design division. This introductory course will be followed by more specialized courses in petroleum refinery and chemical plant design.

In addition to such technical courses, business courses are also planned for the benefit of those primarily interested in the business aspects of the company's operations.

Electricity in the Petroleum Industry

Discussion of electrical applications in the petroleum industry will be featured at the meeting of the American Institute of Electrical Engineers at the Hotel Statler, New York, January 19-23. The special session devoted to petroleum will be held on January 21.

Oil Company Earnings Lower

Net earnings of 43 United States oil companies declined slightly in the first nine months of 1952. The industry-wide strike in May was at least partly responsible for the decrease. The 43 companies earned $1,464,531,000 in the first three quarters of 1952, compared with $1,507,371,000 in the same period in 1951. The decrease was 2.8 percent.

Among the larger companies, Sinclair, Phillips and Gulf showed substantial increases in earnings, contrary to the general trend. Sinclair earnings were up $5.6 million, Phillips $6.5 million, and Gulf $4.2 million. In Canada, Imperial earnings were up $5.8 million. Details of all 43 companies follow:

	9 Months Net Income (Thousands of Dollars)		Per Share Of Common	
	1952	1951	1952	1951
Amerada	3,457	4,366	$1.10	$1.38
Anderson Pritchard	3,246	3,932	3.99	4.83
Atlantic	31,149	31,988	3.37	3.46
Barber Oil Co.	1,638	1,954	2.17	2.58
Chicago Corp.	3,321	3,694	.93	4.13
Cities Service	36,597	42,005	9.41	10.81
Continental	27,995	31,304	2.88	3.22
Deep Rock	407	1,797	.91	4.50
Gulf Oil Corp.	97,802	93,612	4.31	4.13
Houston Oil	4,389	5,275	3.33	4.00
Imperial Oil Ltd.	31,415	25,598	1.05	.86
International Petroleum Ltd.	22,300	23,000	1.54	1.58
Lion Oil Co.	7,528	8,305	2.44	....
Louisiana Land & Explor'n	2,015	2,117	.68	.71
Maracaibo Oil Exploration Co.	243	462	.49	1.03
Mid Continent	11,739	13,282	6.32	7.15
Mid West Oil	3,905	4,037	1.46	1.51
Ohio Oil Co.	30,425	30,950	4.64	4.72
Pacific Western Oil Co.	6,376	6,483	1.32	1.34
Pancoastal Oil	698	641	.10	.09
Panhandle Oil Co.	694	1,024	.44	.64
Pantepec Oil	1,180	871	.39	.29
Phillips Pet. Co.	56,292	49,752	3.89	3.74
Plymouth Oil	7,151	7,471	2.97	3.11
Quaker State Oil	1,334	1,504	1.44	1.62
Richfield Oil	17,993	21,214	4.50	6.44
Shell Oil Co.	20,102	23,550	1.49	1.75
Seaboard Oil Co. of Del.	3,750	4,873	3.07	3.98
Sinclair Oil	64,085	58,431	5.24	4.83
Skelly Oil Co.	19,856	22,037	6.91	7.67
Socony-Vacuum	121,000	119,000	3.80	3.74
Standard Oil Co. of Calif.	130,364	130,461	4.55	4.55
Standard Oil Co. of Ind.	86,794	105,404	5.65	6.88
Standard Oil Co. of Ky.	7,230	7,064	2.78	2.71
Standard Oil Co. of N.J.	391,000	403,000	6.45	6.65
Standard Oil Co. of Ohio	12,668	15,045	3.00	3.95
Sunray Oil Co.	18,572	18,000	1.73	1.65
Texas Co.	128,888	132,063	4.69	4.80
Tide Water Associates	24,828	26,771	1.94	2.09
Union Oil Co. of Calif.	19,494	19,859	3.57	3.64
Venezuela Co.	1,815	2,956	.45	.74
Wilcox Oil Co.	561	618	2.00	2.20
Warren Petroleum	2,235	1,601	1.35	.94
TOTAL	$1,464,531	$1,507,371		
DECREASE 2.8 Percent				

The Spindletop Story

Spindletop, by James A. Clark and Michel Halbouty; published by Random House, Inc.; 306 pages. $3.95.

If the drilling of the Drake well on Oil Creek in 1859 is accepted as marking the start of the oil industry as a commercial entity, the discovery of Spindletop near Beaumont, Texas, in 1901 must be recognized as inaugurating a new era in the development of the industry. Oil had been found at various places outside of Western Pennsylvania and even at points in Texas before its sensational eruption on the Gulf Coast stirred the world as nothing had before and added the word gusher to the oil vocabulary.

While there have been many oil booms, first and last Spindletop was in some respects the epitome of all others put together. It combined the hysterical excitement, the unbridled speculation and the fake promotions that marked other extraordinary discoveries of the earlier days of petroleum, but it also led to the foundation of great and successful companies. It was here that geologists found it necessary to revise certain of their earlier ideas as to where oil might be found, and where operators learned a lot about drilling that they had not known before. Many advances in methods and equipment grew out of hard experience at Spindletop, including the general adoption of rotary drilling and the development of specialized machinery to cope with difficult conditions.

It is altogether fitting, therefore, that the record of this milestone in oil history with its high and low lights, its tragedies, its successes and the lessons it taught, should be preserved for history.

This task has been performed in complete detail and with amazing accuracy in a work that provides a story full of fascination not only for oil men, but for all others who want to inform themselves on an exciting chapter of oil history at the turn of the century. The authors of *Spindletop*, which is sub-titled "the true story of the oil discovery that changed the world," had the advantage of being able to draw on the personal recollections of men who had lived through the exciting days of the discovery and to whom it was still a fresh though distant memory.

Fortunately too, the co-authors, James A. Clark and Michel Halbouty, write from a deep familiarity with the oil industry and so have been able to combine technical accuracy with the drama of their story.

Childs Heads Reed Tool Sales

The Reed Roller Bit Co. of Houston has appointed W. L. Childs, Jr. as sales manager of the oil tools division. The announcement was made by R. G. Hamaker, vice president in charge of sales. Mr. Childs has been with Reed ever since his graduation from the University of Texas except for the period between 1941 and 1946 during which he served in the Air Force.

W. L. Childs, Jr.

DU PONT REG. U.S. PAT. OFF.

PETROLEUM CHEMICALS DIVISION NEWS

DU PONT REG. U.S. PAT. OFF.

January ★ *One of a Series of Interest to the Petroleum Industry* ★ *1953*

When the Customer Says "KNOCK"

The chances are it is caused by some factor other than gasoline quality.

To point up the seven common causes of knock – other than gasoline quality, Du Pont recently made up a folder on the subject.

Although originally designed to be handed out during dynamometer demonstrations, the folder proved to have such popular appeal that it has now been made available separately to oil company marketing groups for distribution to dealers.

For sample copies and information on how to obtain the folder, write the Wilmington office or any of the district offices of the Du Pont Petroleum Chemicals Division. Ask for the folder, "When the Customer Says 'Knock'."

Wildcat . . .
The Educational Game of Drilling Facts and Risks

About a year ago a game based on actual drilling statistics was developed and patented by the Du Pont Petroleum Chemicals Division. This game called "Wildcat," while entertaining, shows in a dramatic manner the high cost and the financial hazards of the search for oil.

The players act as individual operators. Starting with $900,000 they must lease properties, drill wells, produce and market oil—as well as pay the taxes on their profits. The odds in the game are based on national averages. Taxes paid reflect actual rates and depletion allowance is included.

When first developed the cost of making the game was believed too great to allow wide distribution. Costs have now been reduced to the point where packaged, personalized games can be made for about one-sixth the original quoted price. This is cost of manufacture only. Necessary plates, dies, etc. are available without charge through the Petroleum Chemicals Division.

The first order for "Wildcat" has been placed and shipment received. Sample games are available to petroleum companies. Your Du Pont service representative can obtain a sample for you.

Suggested uses for the game are as an employee relations or public relations tool, or as part of a marketing program where a giveaway is desired.

The Service Station And The Motorist

National survey of consumer buying habits documents the Who . . . How . . . What . . . When and Where of service station purchases

A survey of buying habits at service stations has just been completed for the Du Pont Petroleum Chemicals Division. It was made as part of continuing market research studies. To date it is the largest single effort of this program. It is national in scope and contains five separate parts. The first is based on interviews in car-owning households. The other four are seasonal observations at service stations.

Pictured above is **E. HEARN SIMPSON,** Sales Manager of the Du Pont Petroleum Chemicals Division, at whose suggestion the survey was made. This picture points up the voluminous nature of the information collected to date.

The purpose of the survey was to document nationally and by four major marketing areas, the purchase patterns, attitudes and trends on the part of service station customers. It was designed to report accurately and impartially, information concerning the motorists' knowledge of gasoline brands and grades. Services asked for, given and expected were checked. Buying habits of oil and TBA items were probed.

All were analyzed and compared on the basis of four broad marketing areas, Northeast, South, Central and West, and by sex, income and age of the respondents. The service station observations were

OVER

ADVERTISEMENT—Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)

DU PONT

PETROLEUM CHEMICALS DIVISION
NEWS

DU PONT

CONTINUED *Buying Survey*

catalogued by age and price of car. As such, we believe this survey to be the most comprehensive, penetrating and accurate ever undertaken by any segment of the petroleum industry.

PARTS TO BE PUBLISHED

From time to time, as information is collated and summarized, various portions of the survey will be printed by Du Pont and distributed to oil company marketing groups. The first of these reports is now being made ready for publication. It covers in brief form the selection of a service station and loyalty to the service station.

The reactions of dealers and station attendants, as well as motorists, were studied and are reported in the survey. To assure the utmost accuracy, the information was collected by two different methods – by interview and by observation.

SEASONAL BREAKDOWN

All of the interviews and observations were made by trained observers. More than 3,100 home interviews and approximately 24,000 observations of individual motorists at 1,193 service stations have been completed. The observations were spread over a year with about 6,000 being done in each of the four seasons – Spring, Summer, Fall and Winter.

The household study provides a base for measuring what people *say they do, why they do and think* certain things when buying gasolines. The station observation study shows what motorists *actually do* when buying gasoline. It also provides an insight into the kind of job the service station attendant does in selling gasoline, oil and TBA; and in providing customer services.

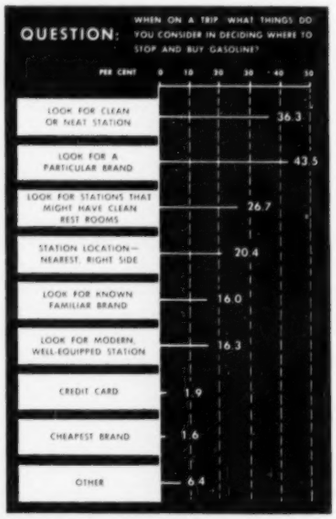
The 1,193 service stations and the 3,100 automobile-owning households were selected by the area sampling method. This is the same selective method that is used by the U. S. Bureau of the Census and by the Bureau of Internal Revenue as being the most accurate and representative. An indication of this accuracy is shown by the almost exact correlation between the makes of cars owned by families interviewed and the total car registration figures.

VOLUMINOUS STUDY

Six volumes totaling almost 800 pages make up the household interview reports. For ease of study these have been divided into six broad subjects:

1. Selection of the service station and station loyalty.
2. Brand name recognition and loyalty to brand.
3. Knowledge of gasoline grades and reasons for purchase.
4. Price, credit cards and charge accounts.
5. Oil and TBA purchases.
6. Services wanted by the motorist, asked for by the motorist, and given by the dealer.

Each of the four service station observations requires two volumes to report the findings. These add to and check the information obtained during the interviews.



TRAVELERS look for *brands* and clean *stations*. Regardless of the grade they buy, it's your brand that brings them in.

INFORMATION AVAILABLE

The full and complete information obtained by the survey is recorded on IBM cards and held for Du Pont by National Analysts, Inc., of Philadelphia, a subsidiary of Curtis Publishing Company. In this manner various cross checkings can be made as, for instance, services expected at west coast service stations by men between the ages of 35 and 50 years. Or, to provide an additional information breakdown such as urban vs. rural gasoline buying habits.

While this indicates the great scope of the survey, it also shows the difficulty volume-wise of assembling a complete survey for delivery to persons interested. However, material in the survey is available to the petroleum industry. Questions or requests for information should be addressed to any of the offices of the Du Pont Petroleum Chemicals Division.

LITERATURE AVAILABLE

Here is a partial listing of the bulletins, reports, booklets and aids available to you through your Du Pont Petroleum Chemicals Division district office:

Safety for the Small Refinery – A 42-page book on how to set up an effective small refinery safety program . . . . . Serial A-2848

Tank Talk – A 52-page, easy-to-understand safety booklet for tank-cleaning crews . . . . . Serial A-1134

Stability of Present-Day Gasolines – A 12-page paper on the value of storage tests—as compared with induction period—for determining stability of modern gasolines . Serial A-3199

MOVIES AVAILABLE

Pipeline on Wheels—A 26-minute, full-color movie on tank truck safety. Suitable for both training and public relations purposes.

What Makes A Gasoline Good—An 18-minute cartoon movie in color. Presents the story of how high quality gasoline is made in easy-to-understand form. Ideal for dealer training meetings.

In addition to the above, Du Pont makes available a special library of films of particular interest to the petroleum industry.

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. . . through Chemistry

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A-4687

Printed in U. S. A.

NPC Reports on Storage

The National Petroleum Council has released a special report requested by the Deputy Petroleum Administrator on petroleum storage capacity and storage requirements in the United States.

The report, presented by L. S. Westcoat, chairman of the committee on storage, shows total capacity for storage of crude oil in tanks above ground in the country as a whole of 429,400,000 barrels on March 31 last. Total crude oil in tanks, pipe lines and tankers was 238,400,000 barrels. The amount in tanks alone was 192,700,000, indicating above-ground storage tanks to have been 44.9 percent full. The combined total of all unavailable stocks of crude amounted to about 63.3 percent of all crude in storage.

Total storage capacity assigned to clean products amounted to 425,500,000 barrels, and there were 203,800,000 barrels of products stored therein, thus indicating assigned capacity to have been approximately 47.9 percent full on the date indicated. It was estimated that total storage capacity for these products would be approximately 443,100,000 barrels by December 31.

Of the 220,300,000 barrels of clean products reported in storage on March 31, 87,000,000 barrels, or about 39.5 percent, was unavailable for shipment, including 8,200,000 barrels required for pipe line fill and 8,300,000 barrels average in transit by tanker barge, tank car and truck. Unavailable inventories have been increased during the past four years.

The conclusion of the committee is that the industry must maintain approximately 100 barrels of petroleum storage for every 50 barrels of actual inventory.

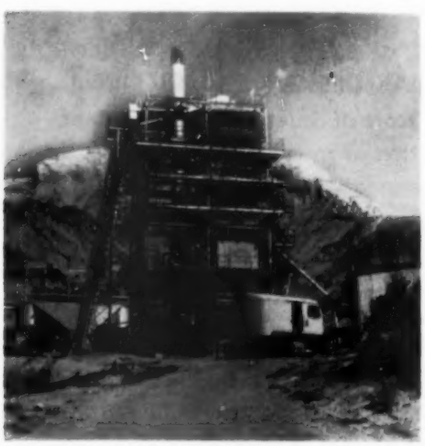
36-Inch Pipe Bender

Crutcher-Rolfs-Cummings, Inc., Houston, Texas, in cooperation with Transcontinental Gas Pipe Line Co., has completed the first 36-inch smooth pipe bending machine ever built. The machine is portable, track mounted, and weighs 33,000 pounds. In recently completed tests, the new machine smooth bent cold pipe one-half degree per foot. The test pipe had a wall thickness of 0.393 inch and a nominal yield strength of 52,000 psi.

Shale Oil Contract Awarded

The Catalytic Construction Co. has been awarded a contract by the Bureau of Mines for process and engineering design of a new catalytic refining unit for the oil-shale demonstration plant at Rifle, Colo. A construction contract on the 50-barrel-a-day unit will be awarded in the 1953 fiscal year, if funds are appropriated.

Construction recently was completed of a demonstration-scale "gas combustion" retort for continuous extraction of oil from oil shale. The new 150-400-ton unit was built by the Blaw-Knox Construction Co. It is patterned after a 6-ton-a-day pilot plant developed at Rifle.



Demonstration "gas combustion" retort at Rifle, Colorado for continuous extraction of oil from shale.

Humble Employees Win Safety Award

In a brief ceremony held December 3, Hines H. Baker, president of Humble Oil & Refining Co., presented to employees of the Baytown refinery the National Safety Council's Award of Honor. Plants manager Gordon L. Farned received the plaque in behalf of the employees.

The award is given to industrial groups which show a decline in frequency rate of injuries over a three-year period. The years involved were 1948-50, compared with the accident experience of 1951.

"For the first ten months of 1952 our refining department has bettered its own record," Mr. Baker said. "Its rate now stands at 1.14 disabling injuries per million hours, while the industry-wide rate is 7.0 for the same period.

Packaged Compressor Plant

A new 550 hp packaged compressor plant has been announced by the J. B. Beaird Co., Shreveport, La. It is the largest packaged compressor on the market. Like other Beaird packaged plants, it is completely packaged, including all gas piping, scrubbers, manifolds, and when required, interstage scrubbers and cooling coils. The cooling system has a radiator with coils for jacket water, lubricating oil and gas. Water temperature is controlled automatically.

Other components include air starting unit, air filter, all piping for gas, water and oil, and automatic controls for unattended operation in the field. The plant is completely assembled at the factory and mounted on a structural steel base. It may be transported as a unit to the location and requires only a concrete slab as a foundation.

Book Review

Petroleum Tankage and Transmission, by H. L. O'Brien; published 1952 by Graver Tank and Manufacturing Co.; East Chicago, Ind.; 176 pages. $5.00.

In this book "tankage" means vessels for the storage of petroleum and its derivatives, and "transmission" means the use of all those accessories such as pipes and pumps needed for transfering petroleum from one vessel to another, in and around an oil field or a refinery, without loss or waste. In this latter connection, it is interesting to note that the author is the Graver company's product manager for conservation equipment.

The work comprises four chapters: the storage of petroleum and its derivatives; conservation equipment; a guide to the economic selection of tankage; and fluid flow in practice. In addition, there are two appendices containing notes on the correct selection of pumping equipment and important miscellaneous data.

Chapter One deals with the effects of temperature, vapor pressure, and vapor volume on evaporation, and the forms of tanks in relation to these circumstances. Chapter Two particularizes on the expansion roof tank, the "vapor-mizer," the floating roof tank and various forms of pressure vessels. Chapter Three follows through with charts and instances that distinguish the advantages of certain types of equipment from others. Chapter Four sets forth the numerous variable factors that affect the viscosity of oils, and the bearing of these circumstances on the design of pipe lines for transmitting oil products. Throughout, the text is illustrated by graphs, charts, examples and photographs.

In sum and substance this book reflects the long experience of the Graver company in the design and fabrication of oil-handling equipment for the petroleum industry. Mr. O'Brien has availed himself of the experience and knowledge of his colleagues in the company, he has drawn freely from the records of the company's research and development department, and has sought and obtained the advice and criticism of engineers in the service of major oil companies and pipe line operators. His book is fit to be a standard reference work on petroleum tankage and transmission, with special emphasis on conservation.

Petreco distillate treating installation.

New Distillate Treating Process

The Petreco Division of the Petrolite Corp. has announced the successful development of an electric process for treating distillate stocks with acid, alkali, doctor or similar chemicals.

The new process is designed to provide continuous, automatically-controlled treating with predictable results. One of the interesting features of the process is the comparatively small amount of equipment and ground space required, the treater usually not being larger than 10 feet in diameter. Another feature is that additional operating equipment is, in many cases, virtually eliminated.

The process is applicable to distillate stocks such as naphthas, gasoline, kerosine, cat-cracker charges, cat-cycle oils, diesel fuel and furnace oil. The processing system is entirely closed, thereby preventing the escape of fumes or air pollutants. Electric power requirements are within the normal capacity of the usual refinery power supply.

Automatic devices control the entire treating operation. This high degree of control results in intimate contacting of the distillate by the treating agent, which generally results in less chemical used per barrel of oil treated. At the same time, the action of the electric treater is fast, assuring a quick break and complete separation. In acid treating, the amount of acid sludge formed is reduced, and the sludge is suitable for re-use or recovery. In caustic treating, emulsion in the caustic effluent is eliminated; in doctor treating, no blackstrap is formed.

Two refiners, one in California and one in Kansas, have made commercial applications of the process with entirely satisfactory results. The California installation is an acid treating plant, primarily for the de-sludging of cracked gasolines, and the Kansas installation is a doctor treating plant.

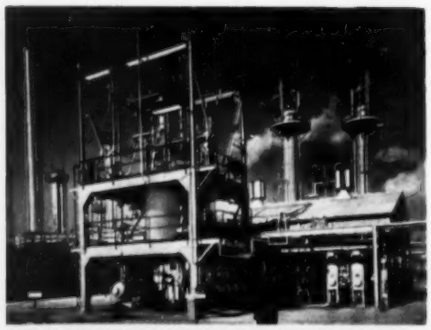
Truck Catalog

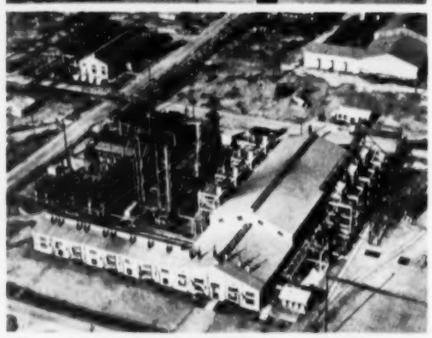
A new catalog recently released by the International Harvester Export Co. describes many heavyduty engineering features of five models included in the International L-160 truck series. Engineering features of these and other International Truck models treated at length in the catalog include the "Comfo-Vision Cab" which provides greater comfort and visibility for the operator; the valve-in-head Silver Diamond engine which generates greater power; and engineering improvements in the chassis, axles, springs and brakes.

Joins Evans Cooperage

J. Fernandes, Jr., has resigned as manager of the export department of Atlas Lubricant Corporation to become manager of a similar department with Evans Cooperage Co., Lee Circle Bldg., New Orleans, export agent for Pan-Am Southern Corporation.

HERE ARE 5 REASONS WHY YOU SHOULD TALK TO M. W. KELLOGG ABOUT Petrochemicals Processing...





1 **NEW PROCESSES AVAILABLE . . .**
Using new processing techniques, Kellogg is now in a position to design plants for the production of a wide variety of valuable chemicals from hydrocarbon feeds. As a result of recently completed arrangements these include, for example, urea via Montecatini's vastly improved process. Others are ammonia, phenol and acetone, aromatics, higher aliphatic and cyclic alcohols, and phthalic anhydride.

2 **CURRENT PRACTICAL DESIGN EXPERIENCE . . .**
Today, with nearly a score of different chemical plants either under construction or in engineering, Kellogg is able to offer broad chemical experience—all based on the practical chemical engineering philosophy of continuous processing in integrated plants.

3 **EXTENSIVE LABORATORY FACILITIES . . .**
Kellogg pilot plant and organic laboratory facilities are among the most extensive in the industry. The firm is well known among the process industries for its ability to cooperate closely in the development of new proc-

esses—and for its engineering know-how in the translation of pilot plant and semi-commercial plant data into profitable commercial operations.

4 **PETROCHEMICAL BACKGROUND . . .**

Since World War II when Kellogg engineered butadiene and ammonia plants . . . and later, special units for the production of ethylene, hexylene glycol and ethyl chloride as well as highly efficient fractionation systems for the concentration of butylene . . . the company has continued its research and development work in this expanding field.

5 **BASIC ENGINEERING DATA . . .**

Behind the relatively new developments in chemical processing, Kellogg has a vast reservoir of technical data built up over years of designing, engineering and erecting petroleum refineries all over the world. Much of this experience is directly applicable to chemical process design.

• • •

If you have a refinery by-product that you wish to upgrade in value to petrochemical intermediate or final product, consider Kellogg's *practical* experience. Write—

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These current projects demonstrate Kellogg's versatility in the chemical field...

AMMONIA
ISO-OCTYL-ALCOHOL
PHENOL
AROMATICS

In the United States

For Shell — An anhydrous ammonia plant for the West Coast.

For Standard Oil Co. (Indiana) — An iso-octyl-alcohol plant now under construction in the midwest.

For Pan-Am Southern — The first Fluid Hydroformer. Although scheduled to upgrade naphthas to high grade motor gasoline, the unit can alternatively produce aromatics such as benzene, toluene and xylene.

For Cities Service — Two more Fluid Hydroformers, one for the Midwest and the other for the Gulf Coast.

SEVEN PLANT COMPLEX

In Italy for Montecatini—Seven important units for the production of ethylene, propylene, and butylene as well as final products such as isopropanol, secondary butanol and phthalic anhydride.

PHENOL FROM CUMENE

In Canada for B-A Shawinigan — The World's first phenol-from-cumene plant. Scheduled for completion early next year, it promises to provide high quality phenol at low cost.

NAPHTHA PYROLYSIS

In England for ICI— Just completed, a naphtha pyrolysis plant producing better than 99.8% pure ethylene as well as useful by-products such as propylene and butylene. Also for ICI, a phthalic anhydride unit, now in engineering.

GASOLINE FROM COAL SYNTHESIS

In South Africa for SASOL—A large gasoline-from-coal synthesis plant employing Kellogg's Synthol process. Special separation equipment to recover valuable alcohols and other oxygenated chemicals is part of the program.

New Socony-Vacuum Subsidiary

Socony-Vacuum Oil Company, Inc. has formed a new subsidiary to conduct exploration and producing operations in the Williston Basin and in the northern portion of the Rocky Mountain states, and to coordinate activities in this area with those conducted by the Socony-Vacuum Exploration Company, a wholly-owned affiliate operating in western Canada. Operations will be handled from Casper, Wyo., until location of permanent headquarters is decided upon.

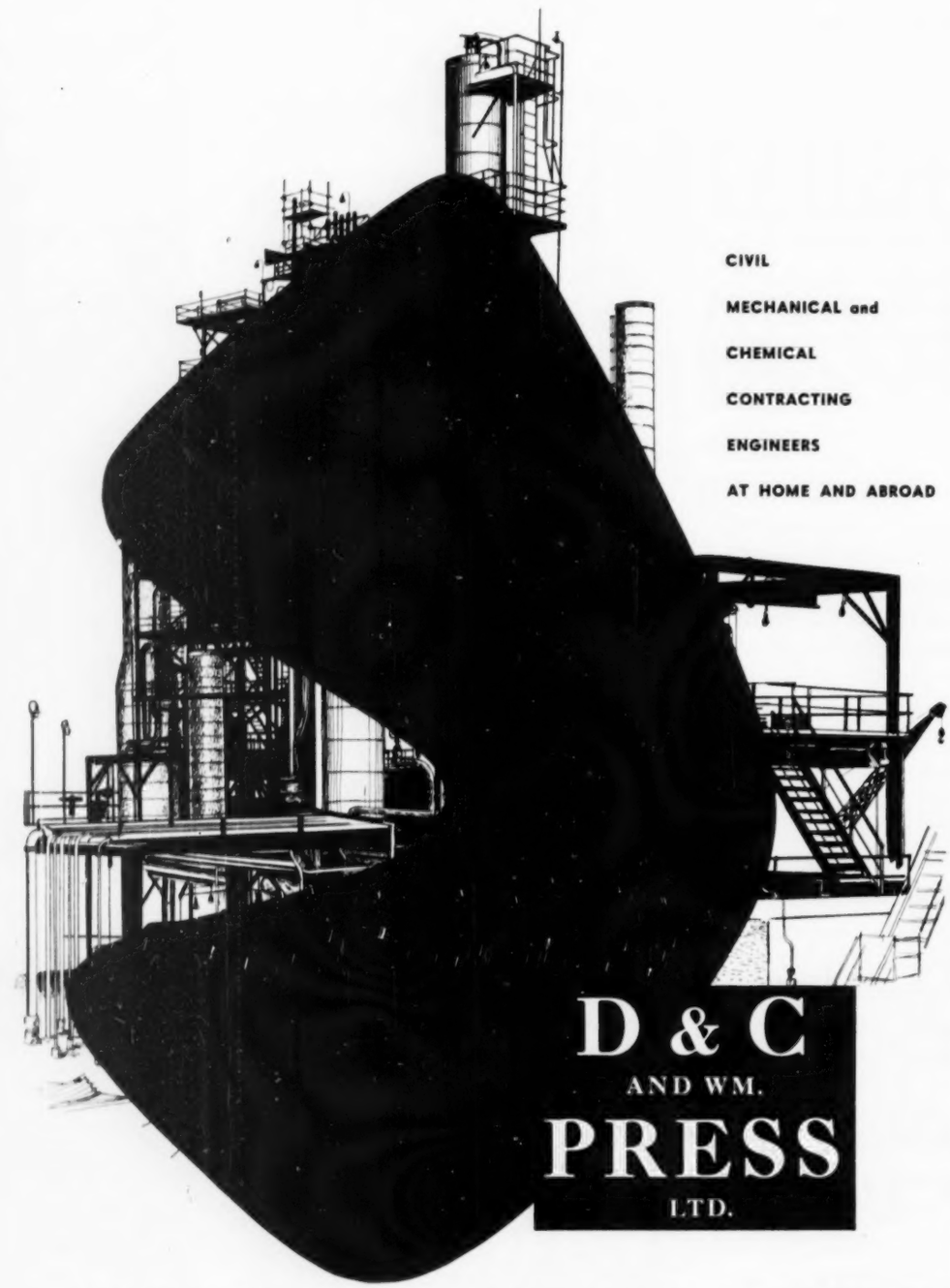
W. W. Clawson, presently chief geologist of Magnolia Petroleum Co., will be president and general manager of the new organization. A. F. Barrett, now manager of the Rocky Mountain division of General Petroleum Corp. at Casper, Wyo., will be manager of production. H. R. Moorman, now vice president and manager at Calgary, will become executive vice president and will continue as manager of Canadian operations.

Chemical Pump

Sigmund Pumps Ltd., Terminal House, Grosvenor Gardens, London, SW 2, has published leaflet No. 6501 describing its type A-N chemical pump. In the A-N pump design, the impellers and volute can be changed to meet different capacity head conditions or material specifications while using the same bearing and support frame. In this way, spare stocks can be carried at a low level and considerable savings can be achieved.

Heads Attapulgus Technical Division

C. Y. Haas has been appointed manager of the technical division of Attapulgus Clay Co. at the Camden, N. J. laboratories. He has been in charge of sales and technical service activities in connection with Attaclay since 1946.



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Washington Dateline

(Continued from page 53)

In 1932 he was elected mayor of Salem, Oregon, and has been in public life almost ever since. The political path led through the state legislature and to governorship of the state in 1949. McKay is said to be quiet and mild, conservative with money, and a compromiser. He is married and has two daughters. A son died in 1939 in an automobile accident.

On December 7, 1941, Mr. McKay was in Honolulu, Hawaii, when the Japanese bombed Pearl Harbor. The Governor helped dig trenches that day. He served in World War II as a captain.

As for Secretary Chapman, the oil industry, through the National Petroleum Council, gave him an unusually warm goodbye at a dinner in Washington in his honor attended by 300 oil and government executives.

Chairman Walter S. Hallanan of the council, who is president of Plymouth Oil Co., expressed the industry's "deep sense of gratitude" to Secretary Chapman for his "unfailing support" of the industry through the council.

"I fought to keep an industry man as council chairman," Secretary Chapman replied, touching on the unique feature of the council's powers. "Had I wanted the advice of a government-dominated group, I could have gone to the government."

The naming of Mr. Brownell as head of the Justice Department was agreeable to oil industry members, as they feel that he understands business affairs. One of his first decisions will be what to do with the department's federal grand jury action against international oil companies. At the same time, President-elect Eisenhower named William P. Rogers as deputy to Mr. Brownell, the number-two legal post in government. Oil men recall Mr. Rogers as counsel for the Senator Brewster investigating committee which, in 1948, published a report critical of one mid-eastern oil company and suggesting the government take more direct interest in foreign oil activities. A major tipoff to Mr. Brownell's attitude toward oil, the cartel, and business in general, will come when he selects the man to head up his antitrust division.

New Baroid Plant

Construction has begun on a new Baroid Sales processing plant and warehouse in Corpus Christi, Texas. The new plant is expected to start operation on January 1, 1953 with an initial capacity of 5,000 tons a month. National Lead Co. leased approximately 15 acres of navigation district land, including 600 feet of waterfront for a dock and unloading facilities, from the Port of Corpus

Vladimir N. Ipatieff

Prof. Vladimir N. Ipatieff, 85, world-famed petroleum chemist and director of chemical research for Universal Oil Products Company, died Nov. 29, 1952 following a short illness.

He was generally regarded as the world's foremost authority in the field of catalysis and it was in this area that he spent the major portion of his remarkable career. He is particularly known for his fundamental research and development on the processes which contributed to the development of high octane aviation gasoline, alkylation, polymerization, and isomerization.

In addition to his work for Universal at their Riverside, Illinois laboratories, Professor Ipatieff was an active member of the faculty of Northwestern University, where he set up and supervised the Ipatieff High Pressure and Catalytic Laboratories, the only unit of its kind on the campus of any American university.

Dr. John M. Pearson

Dr. John M. Pearson, director of production, physical and development research, for Sun Oil Co., died Nov. 16 after a month's illness of heart disease. He was 48. Dr. Pearson was an expert in corrosion prevention through cathodic engineering.

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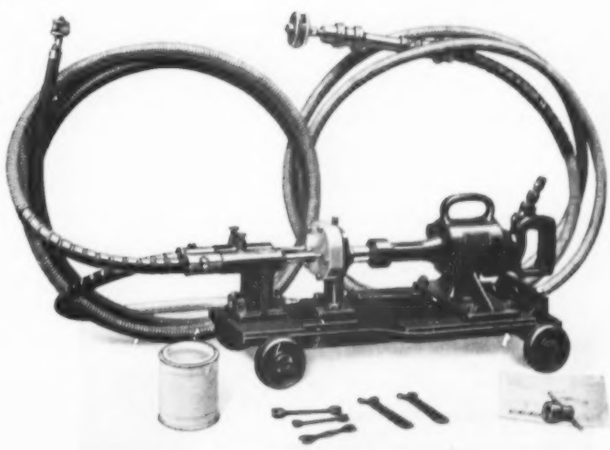

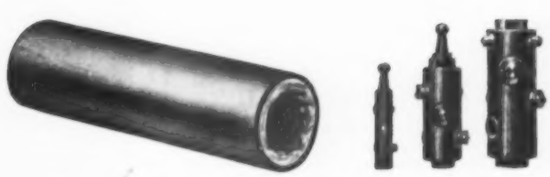

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High Strength Carbon Steel Casing

API casing in Grade N-80 for deep oil wells, usually made of normalized-and-drawn high manganese-molybdenum steel has, for the past five years, been successfully produced from plain carbon-steel at the Ambridge, Pa. plant of Spang-Chalfant Division, The National Supply Co., according to a paper presented before the recent meeting of the Association of Iron and Steel Engineers by F. H. Bremmer and F. J. Zehnder.

The new process, using a continuous heat-treating quench and draw line to give the steel its specified characteristics, has produced over 80,000 tons of casing with a saving of over 300,000 pounds of molybdenum and nearly 1,500,000 pounds of manganese.

Steel of the following analysis is being used in the process: carbon, 0.30 to 0.40; manganese, 0.60 to 0.90; phosphorus, 0.04 maximum; sulfur, 0.05 maximum; and silicon, 0.25 maximum.

Using steel of this analysis, all sizes of Grade N-80 threaded and coupled casing from 4½ through 9⅝-inch O.D. having wall thicknesses no heavier than 0.453 inch have been successfully produced. Physical properties are equal to or superior to normalized or normalized-and-drawn high manganese-molybdenum casing. Service history for the total production of over seven million feet has been very good.

A secondary objective for the use of this continuous heat-treating equipment is for the production of upset end casing having a minimum yield strength of 110,000 psi for use in extremely deep wells, 20,000 feet and over. Considerable experimental work has been conducted to produce this grade of casing from boron treated carbon manganese steel. These experiments have been quite successful and the material produced has met all the physical properties required for this higher grade of casing. Prior to the current general unavailability of nickel-alloy steels, casing to meet this severe application was made of normalized-and-drawn SAE-4340 steel.

The continuous heat-treating line contains a series of high-intensity radiant gas fired furnaces and quench head. In operation, the casing passes through a set of six furnaces where it is heated to 1,600° F in preparation for the quenching operation. Emerging from the last furnace, the casing passes through the quench head, mounted 2½ feet beyond the furnace, where it is water quenched cold. The casing then continues down the intermediate conveyor and over to the second set of furnaces where it is tilted and drained of water.

After a definite time interval for draining, the casing enters the second set of draw or tempering furnaces where its temperature is raised to 1,100° F or 1,150° F, depending on the chemistry of the metal. From here the lengths go through final stages of preparation such as straightening, stress relieving, re-sizing, cropping, threading and hydrostatic testing.

Stainless Steel Meter Bulletin

Bulletin OG-403, describing the new corrosion-resistant stainless steel industrial meter, has been issued by Rockwell Manufacturing Co., Pittsburgh, Pa. Information is included on dimensions, capacity, registers, register weights, units of measurement, materials and meter weight.

SSC Annual Meeting

Seismograph Service Corp. of Tulsa, Okla. held its annual meeting on the occasion of its 21st anniversary Oct. 24 and 25 in the Tulsa Hotel. More than 250 employees from domestic and foreign operations were in attendance.

Officials of foreign subsidiaries included R. F. Aldredge, vice president of Seismograph Service of Mexico; H. C. Bickel, vice president of Seismograph Service of Canada; and J. E. Dorris, vice president of Seismograph Service of Venezuela.

G. H. Westby, Dr. A. J. Barthelmes, and H. M. Thralls reported on the overall scope of SSC's operations which includes more than 60 field crews throughout the world.

New Cooper-Bessemer Catalog

A new, comprehensive M-Line Compressor Bulletin has been published by The Cooper-Bessemer Corp. This 44-page engineering-type catalog provides basic application data with design specifications on Cooper-Bessemer's complete line of reciprocating compressors from 100 to 5,000 horsepower. Requests on letterhead for Bulletin M-70 should be sent to The Cooper-Bessemer Corp. at Mount Vernon, Ohio.

Magcobar Appointments

Charles E. Talbot has been appointed general production manager for Magnet Cove Barium Corp. and will be in charge of all plants and mines of the corporation. He will work out of the Houston office. John Tobler has been named general superintendent of the mine and mill at Malvern, Ark.

C-R-C Expands Staff

With the awarding of the contract for designing of U. S. Pipe Line's giant new pipe line to carry refined petroleum products from Texas Gulf refineries to the East Coast, C-R-C Engineering Co., Houston, has announced plans for enlarging its staff to include some of the top pipe line engineers in the country. The new pipe line will be the largest and longest products line in the U. S. New additions to the staff, announced by Herb E. Fisher, managing director and co-owner of C-R-C, include J. P. Bristow, Frank Edward Hangs, W. T. Pyott, John C. Graper, and E. L. Beeman.

Mr. Bristow has been active in the engineering design, construction and operation of pipe lines for over 25 years. While serving as vice president and project manager of Fish Pipeline Construction Corp. he handled engineering for Fish under the contract with Texas Illinois Gas Pipeline Co. for the construction of the pipe line from South Texas to Chicago. Previously he was directly in charge of engineering and construction of the Tennessee Gas Transmission Co.'s 2,000-mile line. Prior to joining Tennessee Gas he was chief engineer for Northern Natural Gas Co. and was in charge of engineering and construction for more than 3,000 miles of pipe lines varying in size up to 26 inches.

Mr. Hangs comes to C-R-C from Transcontinental Gas Pipe Line Corp. where he was senior mechanical engineer for the design and operation of compressor stations. From 1946 to 1950, he was senior mechanical engineer and project engineer for the Texas Pipe Line Co. He joined Texas Pipe line in 1933 as a mechanical engineer in pipe line design.

Mr. Pyott was formerly chief engineer for Mannix, Ltd. in Calgary, Alberta, Canada. Before joining the Canadian company in 1949, he was assistant chief engineer for Great Lakes Pipe Line Co. from 1941 until 1949 and corrosion engineer from 1935 to 1941.

Mr. Beeman was associated with the National Cooperative Refinery Association at McPherson, Kan., for nine years before joining C-R-C. He served first as traffic manager and later as manager of the distribution division which handled all sales, movement of products, pipe line terminal operations and traffic.

Book Review

"Petroleum Geology," by E. N. Tiratsoo; published 1952 by McGraw-Hill Book Co., New York; 449 pages; $7.50.

This is a book primarily for students who are qualifying for careers as petroleum geologists in institutions such as the British Royal School of Mines, where the author is a lecturer. The treatment covers the academic questions related to the origin, migration, and accumulation of petroleum in the rocks and other formations in the earth's sub-surface, and practical problems of finding and exploiting these accumulations. The student or reader who is concerned with or interested in the oil industry is taken through the various methods of prospecting for oil such as geological mapping, aerial survey, evaluation of surface indications, the sub-surface methods of discovery, and shown how physics and geochemistry are integrated with geology for this purpose.

Since accumulations of oil are intimately connected with lithology and geological structures, the student is extensively indoctrinated in the conditions for an oil field, and how probable oil areas may be recognized. He is taken on a tour (as it were) of the oil fields of the U.S.S.R. and Europe, Asia and Africa, Canada and Mexico, the Caribbean area, and South America, where the relations of geosynclines, mountain building, and Orogenic cycles and belts to oil accumulation are observable. On this foundation, the practical petroleum geologist must base his efforts to locate the spots where oil might be found. The conventional methods of sub-surface exploration—gravitational, magnetic, seismic, electrical, geochemical, geothermal, radioactive, telluric, and bacterial—are described. Considerable treatment is given to the resident geologist's functions at a well that is being drilled, examination of cuttings, cores, fluid samples, interpretation of driller's logs and the data of well surveys, drilling mud control, and the operations of bringing in the well. Very important is the correlation of information obtained from drill cuttings that serves to define and confirm reservoir stratigraphy and structure: micro- and macro-paleontology, mineral analyses, etc. The text is clearly written, which is a great help in such books.

Bulk Storage Plant for Air Force

Air Materiel Command has formally accepted the $2,341,000 petroleum bulk storage plant at North Charleston, South Carolina. It provides a total capacity of 23,500,000 gallons of avigas and jet fuel.

General American Transportation Corporation supplied and erected seven steel storage tanks, each with a capacity of 80,000 barrels, and fitted with Wiggins floating roofs for vapor conservation. Merritt-Chapman & Scott Corporation was general contractor for the project.

New McCullough Tool Catalog

The McCullough Tool Co. has issued a new 40-page, illustrated general catalog. This 1953 catalog contains a complete description of the entire line of McCullough's specialized tools and services. Copies of the catalog are available on request to the company at 5820 S. Alameda Street, Los Angeles 58, Calif.

Department heads and supervisors attending the Seismograph Service Corporation's annual technical meeting in Tulsa October 24 and 25.

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Family Album

Rogers Geophysical Co., Houston, has published a handsome booklet in which the company's staff of geophysicists is pictured and described. The Rogers staff operating in all parts of the world has a combined experience in geophysical prospecting of more than 500 years.

Head of both the foreign and domestic organizations is Sam D. Rogers, who is a veteran of 32 years in the industry. He has done reconnaissance work in many Latin American countries as well as in Europe, Asia and East Indies. Manager of foreign operations under Mr. Rogers is William M. Krum at Caracas, who has been with the company since 1942. Domestic operations manager is James B. Nichols, who also has had much foreign as well as domestic field work.

The 24-page booklet introducing principal members of the Rogers staff in management, research and field work includes an interesting picture section showing unusual field experience and equipment.

Youngstown Promotes Tuthill

John M. Tuthill, for nearly three years manager of flat rolled sales in general offices of the Youngstown Sheet and Tube Co., has been appointed assistant general manager of sales with offices in Chicago. He succeeds the late Arthur M. Long. L. E. Arnold, assistant manager of flat rolled sales, succeeds Mr. Tuthill as manager of the department.

Valve Catalog

Publication of a new six-page catalog section describing a new line of cast steel gate valves has been announced by Edward Valves, Inc., East Chicago, Indiana. The new booklet contains complete information on details of design, material specifications, pressure and temperature ratings, and dimensional details and weights.

Sulfur extraction plant at Sinclair Refining Company, Marcus Hook, Pa.

Sulfur Recovery Installations

Rapid expansion in the provision of facilities for recovery of sulfur from petroleum is evidenced by the report of the Ralph M. Parsons Company that it has completed within the past year or has under design or construction eleven plants devoted to this operation. New installations engineered by the company which have gone on stream within the past two months include units for Shell Chemical Company at Houston, Gulf Oil Corporation at Port Arthur, Texas, Sinclair Oil Company at Marcus Hook, Pennsylvania and Union Oil Company at Wilmington, California.

New Products Line

Continental Pipe Line Co. will build a 600-mile 8-inch oil products pipeline from Billings, Mont., to Spokane, Wash. to be known as the Yellowstone Pipe Line. Terminals will be located to serve the western part of Montana, parts of Idaho, and eastern Washington. The line will have an ultimate capacity of 25,000 barrels of oil products daily.

New Lane-Wells Catalog

Lane-Wells Co. has just issued a revised catalog covering its complete line of technical products and services for the oil industry. This latest issue, which commemorates Lane-Wells' 20th Anniversary in oil industry service, summarizes the latest information on perforating, radioactivity well logging, packers, and bridging plugs.

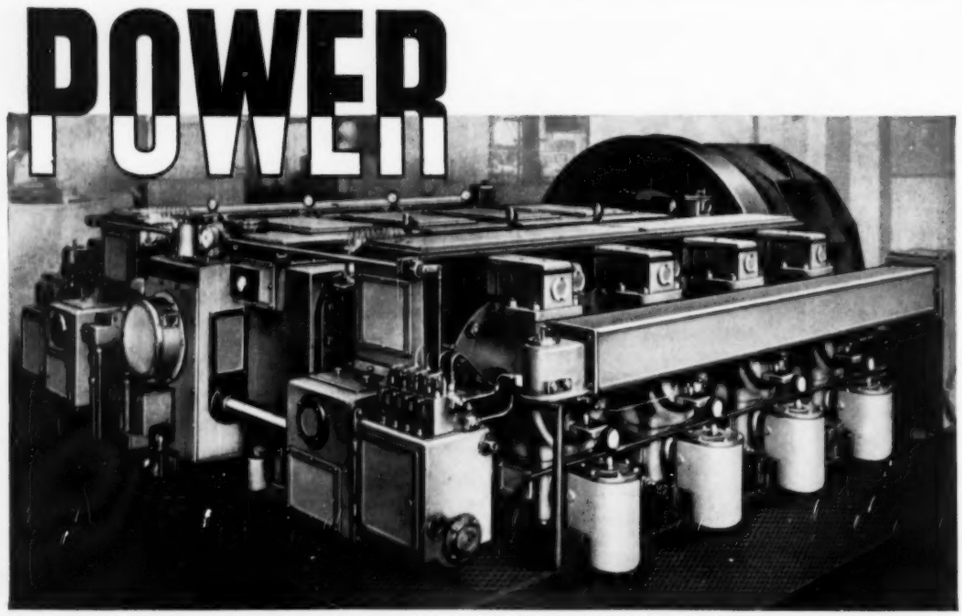
The perforating section gives complete engineering specifications for the 21 types and sizes of perforators used in the company's bullet and Kone-shot services. This section also contains a graph showing the relative penetration of the various guns.

Book Review

Geology and Oil Possibilities of the Philippines, Technical Bulletin of the Philippines Department of Agriculture and Natural Resources, by Grant W. Corby et al.; published 1951 by Bureau of Mines, Manila; 363 pages with numerous maps; paper; U. S. $5.00.

This volume embodies the results of geological surveys of the Philippine Archipelago made during 1939 and 1940 by the National Development Co. for the Philippine government. The authors were required to do their work in 18 months, and were instructed to take particular note of possibilities for finding oil while making a reconnaissance survey of the general geology of the Archipelago. Numerous seeps and shallow wells from which trifling amounts of oil have been obtained are listed; also likely locations for seismic tests on Panay, Cebu, Leyte, the Bondoc peninsula and the Cagayan Valley. The general impression of the report is that such oil deposits as may be found will probably be of limited extent.

Although much belated, the maps and descriptions contained in this report may be useful to oil pioneers who have a mind to look into Philippine possibilities.



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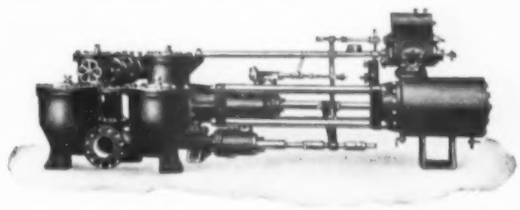

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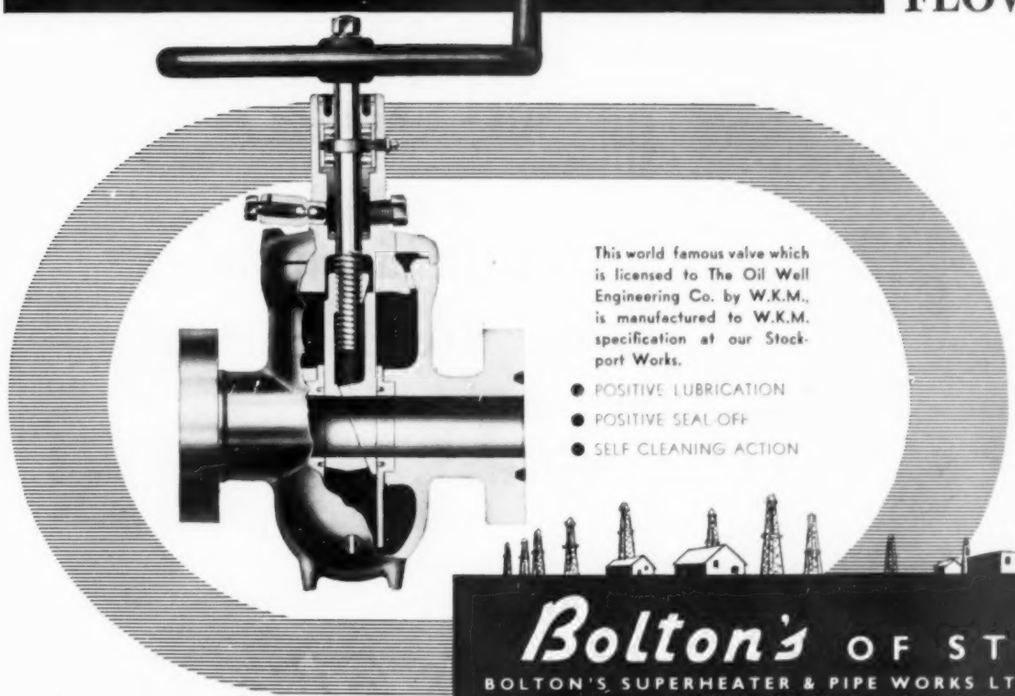

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New High-Slip Motor

A new totally enclosed, fan-cooled, high-slip induction motor, designed for use in acceleration of high-inertia loads such as punch presses, centrifuges, hoists, etc., has been announced by the General Electric Company's small and medium motor department. Designated as Type KRX, the new motor is as much as 30 percent smaller and 40 percent lighter than conventional totally enclosed fan-cooled high-slip motors.

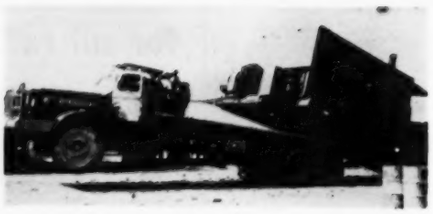
Form Drilling Company

K. H. Houston and F. J. Cameron have resigned from Royalite Oil Co. Ltd., Calgary, to form Petrolia Drilling Co. Mr. Houston was vice president and operations manager and Mr. Cameron industrial relations manager for Royalite. All drilling equipment formerly owned and operated by Royalite has been sold to the new company. Royalite has done its own drilling since 1921, but in the future will employ contractors.

Book Review

Guide du Petrole 1952 (Petroleum Guide for 1952) in two volumes, not sold separately; published by Olivier Lesourd, 252 Rue du Fg. St.-Honore, Paris 8, WAG40-70, France; each volume has more than 500 pages; 4,600 francs postpaid.

Volume I of this 20th edition of the Guide du Petrole contains all French legislation relating to petroleum brought up to date as of June 30, 1952 and complete French oil statistics. Volume II gives information about professional organizations in the petroleum industry, and data pertaining to oil companies and enterprises, their production and refining capacities, research, imports, distribution and finances. This work is valuable to all who require information about the French oil industry.



New Oilfield Truck

A new model Sterling-White chassis developed for oil field operations and other heavy duty service has been announced by the White Motor Company's Sterling division.

Model SB 3255D is engineered for such rugged service as handling drilling rigs and heavy oil field machinery and other heavy-duty off-the-road operations. A 200 hp diesel engine provides the power. Dual transmission, 4-speed main and 3-speed auxiliary give a wide selection of gear ratios. Top speed is 42 mph in overdrive and, with both transmissions in low gear, total reduction is more than 120 to 1. This permits a road speed as low as 2½ mph at full engine-governed speed.

The dual rear axle unit is equipped with a suspension system which is engineered to carry heavy loads over rough, irregular roads and for frequent off-the-road operation in oil field service. Equalizer beams are mounted below the rear springs. This feature provides for equal distribution of the loads, regardless of bumps, holes or other road irregularities.

Sell Pipe Line Division

The pipe line equipment and protection business formerly operated by Perrault Brothers, Tulsa, has been purchased by W. O. Dixon, former airplane-parts manufacturer of Wichita and Coffeyville, Kansas. Under the new ownership the business will be known as Perrault Equipment Co.

Charge Stock Treater

Humble Oil & Refining Co. will build the world's largest solvent deasphalting unit at its Baytown, Texas refinery. The unit will have a charge capacity of 28,000 b/d of vacuum reduced crude. Output will be charged to two recently enlarged fluid cat crackers at Baytown.

The M. W. Kellogg Co. has been awarded a contract for the design and construction of the plant. Erection will begin as early in 1953 as material procurement will permit.

Kellogg To License Autofining

The Autofining sulfur removal process developed by Anglo-Iranian Oil Co. will be licensed to other refiners through M. W. Kellogg Co., according to an announcement by Warren L. Smith, Kellogg president. AIOC is operating a 3,500 b/d plant using the process for removal of sulfur from distillates at its Llandarcy, Wales, refinery. Data on operations was given in WORLD PETROLEUM, June 1952, p. 62.

Book Review

Spanish-English and English-Spanish Glossary of the Petroleum Industry; compiled and published (1952) by the Argentine section of Instituto Sud-Americano del Petrolio; 619 pages, 5¾ x 4½ inches. Sold by Instituto Sud-Americano del Petrolio, Montevideo, Uruguay, Venida Agraciada 1464; $8.00 (U. S. currency).

At the present date, this is the most complete dictionary of the petroleum industry for the use of English and Spanish speaking oil technologists. The two sections each contain definitions of about 20,000 words and phrases, and so far as this reviewer has found, no important terms or phrases have been overlooked. Oil men will find it a useful bridge for communicating and receiving information in the two languages.

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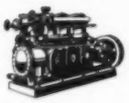

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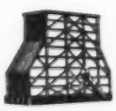

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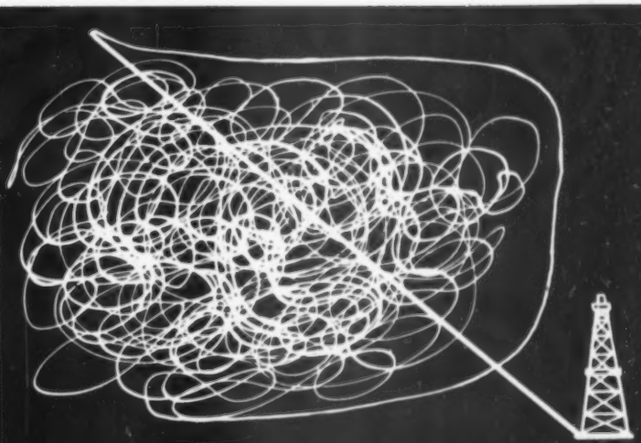

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New Motor Oil

Standard Oil Development Co. has announced a new motor oil which was placed on the market Dec. 1 under the trade name "Uniflow." The new oil has a high viscosity index and detergency qualities. It will sell at a premium of about 50 percent over ordinary grades.

The winter grade Uniflow meets all specifications for SAE 5-W, 10-W, 20-W, and 20, and carries the grade designation SAE 20-5W. It is especially recommended for high compression engines of the newer type which are in good mechanical condition. The oil is claimed to minimize engine deposits, but not to remove old accumulations from the combustion chamber. Since the oil will minimize accumulations, it is claimed to reduce octane requirements for motor fuel in engines after the first 4,000 miles of operation during which deposits normally accumulate to the point that higher octane fuels are required.

Qualities of the new oil are achieved partly through additives and partly through selection of a fraction of base stock and processing. At the moment Standard is not ready to announce the changes which have been made in processing to produce the new oil.

Secondary Recovery Report

"Summary, Secondary Recovery Operations in Oklahoma to 1951" has been published by the Interstate Oil Compact Commission. This report has been assembled through a joint survey conducted by the State of Oklahoma through the Oklahoma Secondary Recovery Committee under the chairmanship of Walker T. Pound and the Secondary Recovery Division of the Interstate Oil Compact Commission. Included in the report is available information on all secondary recovery operations in Oklahoma up to January 1, 1951. Copies may be obtained from the Interstate Oil Compact Commission, P. O. Box 3127, State Capitol, Oklahoma City 5, Oklahoma.

American Cyanamid Makes Appointments

American Cyanamid Co. has promoted a number of its men to new posts in the petroleum chemicals department. The new appointments include: R. B. Wainwright, technical director, New York; V. R. Farlow, eastern regional sales manager, New York; E. F. Heizer, western regional sales manager, Chicago; T. O. McDonald, southern district manager, Houston; Read Larson and Charles O. Brown, Jr., sales representatives in Chicago.

Buys Frank G. Hough Company

International Harvester Co. has acquired the stock of The Frank G. Hough Co. of Libertyville, Illinois, manufacturers of earthmoving, excavating and materials handling equipment. The company will operate as a wholly-owned subsidiary of International Harvester. Exclusive overseas distribution of Hough equipment has been handled by the International Harvester Export Co. which was the largest single customer of Hough.

To Enlarge Chicago Plant

Cities Service Oil Co. (Del.) will build two major additions to its East Chicago refinery. A crude topping unit with capacity of over 30,000 barrels of charging stock daily and a catalytic reforming unit with a daily capacity of over 12,000 barrels daily will be added. The existing delayed coking units will be increased to approximately double present capacity.

Contract has been signed with Arthur G. McKee and Co. for construction of the topping unit. Engineering work on the rest of the facilities is in progress. Field construction on the new topping unit is scheduled to begin early in 1953, with completion of the entire program anticipated by the end of 1954.

Diesel Oil Analysis

"Spectrographic Analysis of Diesel Engine Lubricating Oil," published by the American Locomotive Co. of Schenectady, N. Y., tells in 78 pages of text and photographs how the spectograph is now being used by diesel locomotive engineers to control engine maintenance and prevent costly breakdowns. The new publication presents transcriptions of nine technical papers delivered at a symposium sponsored by American Locomotive last spring, attended by 86 representatives from 43 railroads in all parts of the United States and Canada.

The spectrograph makes a photographic record of the various metallic elements found in diesel lubricating oil samples removed periodically from diesel engine crankcases. Interpretation of the relative quantities of these metallic elements yields an understanding of the condition of many engine components. More economical locomotive operation has resulted from the work.

Book Review

The Tulsa Geological Society Digest, Volume 20 (1952); published annually by the Society at Tulsa, Okla.; 348 pages; $2.

This year's issue of the proceedings of this active geological society contains 26 papers of large interest. Among them is one on the Williston Basin, with maps, two on photo-geology, several pool papers, three on electrical logging, three complete geologic reports on Oklahoma geology with maps and sections, and various articles on stratigraphy.

Ethyl Corporation Appointment

Louis M. Sherman has been appointed associate director of product development in charge of industrial chemicals of Ethyl Corp. He will serve on the staff of William T. Hack, director of product development, according to an announcement by B. Bynum Turner, vice president in charge of research and engineering.

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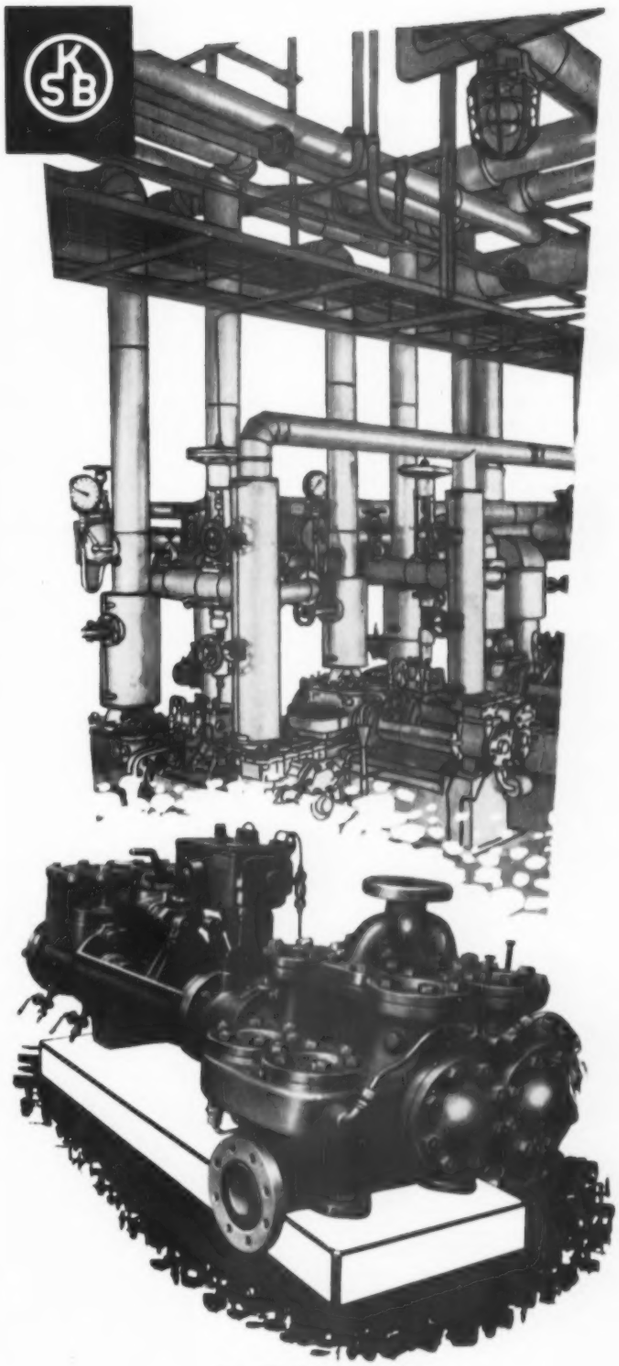

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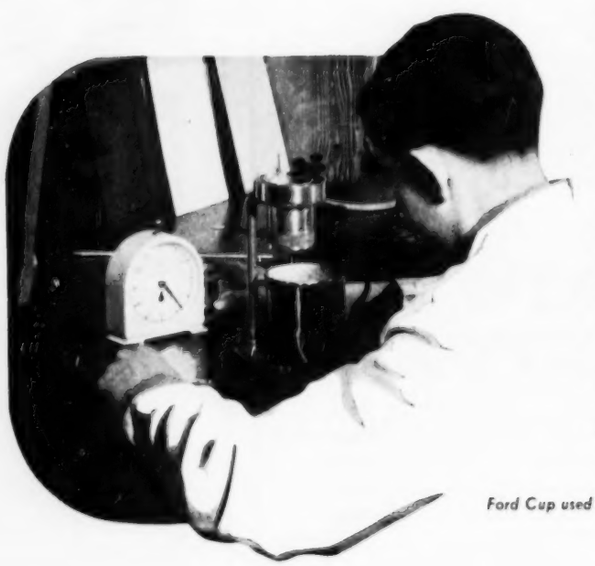

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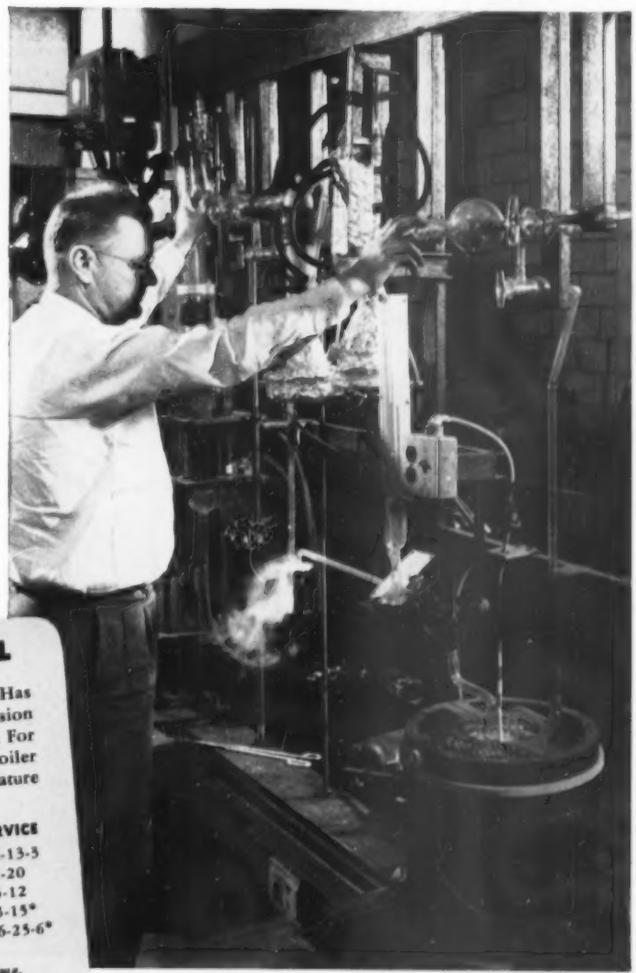

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Fourth annual review of the petroleum industry in Canada. Articles will deal with new field discoveries, the development of oil and gas reserves, new pipe line construction to the Pacific Coast, refinery and petrochemical building.

The May number will be distributed to visitors at the International Petroleum Exposition at Tulsa.

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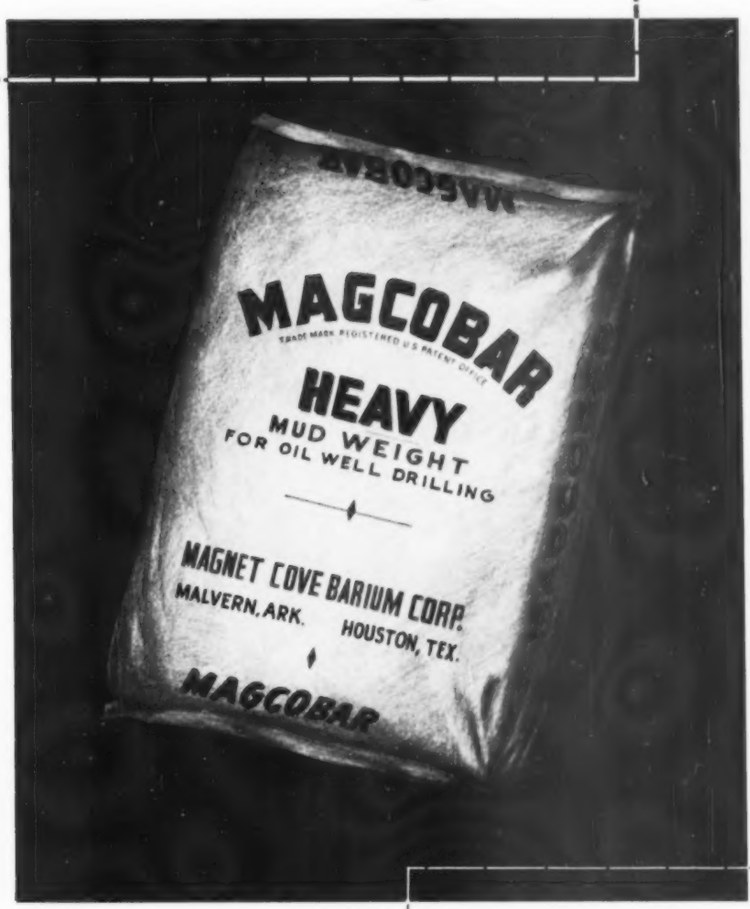
Every issue of WORLD PETROLEUM contains articles dealing with international oil operations, but in September the editors bring the International picture into sharp focus by reviewing world oil operations as a whole.

SEPTEMBER

A.P.I. NUMBER

The American Petroleum Institute meets in November to discuss topics of general interest to the management group. The API issue of WORLD PETROLEUM presents articles by officials of the Institute and the government discussing current problems of the industry and its management. An issue that is read with keen interest throughout the industry and by those in attendance at the meeting.

It's In The Bag



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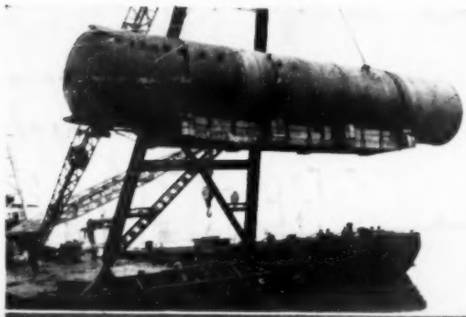

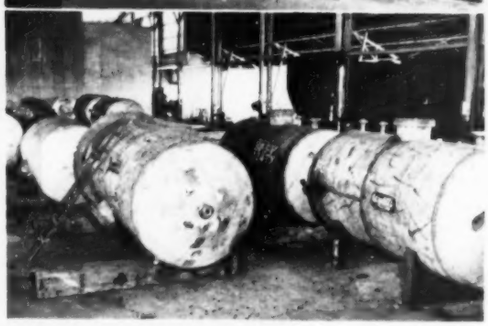

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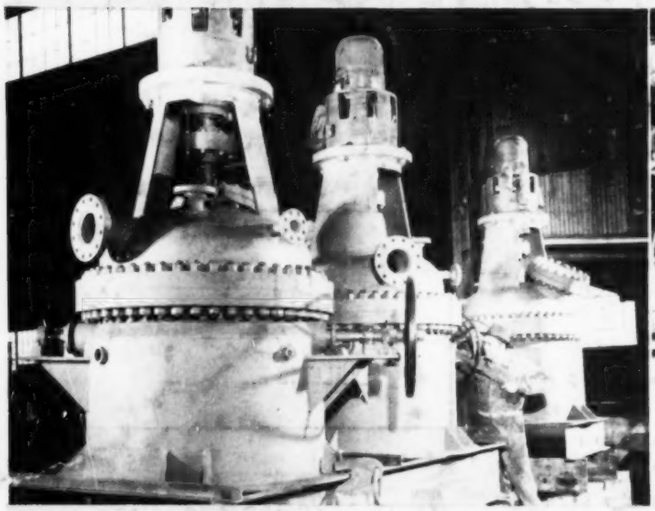

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